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DOMINIC

POR-2030
(WT-2030)
VOLUME 2

FISH BOWL SERIES

This document consists of 302 pages

No. 145 of 280 copies, Series A

PROJECT OFFICERS REPORT—PROJECT 6.11

HF COMMUNICATIONS EXPERIMENT (U)

3 5 0 1 0 9

Howard L. Kitts, Project Officer

CATALOGED BY DDC

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GROUP-1

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downgrading and declassification.

U.S. Army Electronics Research and
Development Laboratory
Fort Monmouth, New Jersey

John B. Lomax, SRI Project Officer,
and the staff of the Communication
Laboratory

Stanford Research Institute
Menlo Park, California

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DEPARTMENT OF DEFENSE
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CONTENTS

PART 2 18-KC PHASE AND AMPLITUDE-----	11
CHAPTER 1 INTRODUCTION-----	13
CHAPTER 2 STAR FISH-----	31
2.1 General -----	31
2.2 Palo Alto -----	31
2.3 Midway -----	33
2.4 Kauai -----	34
2.5 South Point -----	36
2.6 Viti Levu -----	37
2.7 Tutuila -----	38
2.8 Canton -----	39
2.9 Wake -----	40
2.10 Roi-Namur -----	41
2.11 Summary-----	42
CHAPTER 3 CHECK MATE-----	51
3.1 General -----	51
3.2 Okinawa -----	51
3.3 Midway-----	53
3.4 Kauai -----	54
3.5 Tutuila -----	55
3.6 Canton -----	57
3.7 Viti Levu -----	58
3.8 South Point -----	59
3.9 Wake -----	60
3.10 Rarotonga -----	61
3.11 Palo Alto -----	61
3.12 Roi-Namur -----	62
3.13 Summary -----	63
CHAPTER 4 BLUE GILL -----	75
4.1 General -----	75
4.2 Okinawa -----	75
4.3 Palo Alto -----	77
4.4 Wake -----	78
4.5 Kauai -----	80
4.6 South Point -----	81
4.7 Roi-Namur -----	82
4.8 Tutuila -----	84
4.9 Viti Levu -----	85
4.10 Midway -----	86
4.11 Summary -----	87

CHAPTER 5 KING FISH -----	97
5.1 General -----	97
5.2 Wake -----	98
5.3 Kauai -----	99
5.4 South Point -----	100
5.5 Viti Levu -----	102
5.6 Fairbanks -----	103
5.7 Roi-Namur -----	104
5.8 Tutuila -----	105
5.9 Summary -----	106
CHAPTER 6 DISCUSSION OF RESULTS -----	115
APPENDIX TABULATIONS OF SPECTRUM GAPS -----	118

TABLES

1.1 Fish Bowl Event Names and Times -----	24
A.1 Roi-Namur to Hawaii, Star Fish -----	118
A.2 Roi-Namur to Kauai, Star Fish -----	120
A.3 Canton to Fairbanks, Star Fish -----	122
A.4 Canton to Midway, Star Fish -----	124
A.5 Kauai to Wake, Star Fish -----	126
A.6 Kauai to Midway, Star Fish -----	128
A.7 Canton to Hawaii, Star Fish -----	130
A.8 Canton to Wake, Star Fish -----	132
A.9 Canton to Viti Levu, Star Fish -----	134
A.10 Canton to Tutuila, Star Fish -----	136
A.11 Canton to Rarotonga, Star Fish -----	138
A.12 Roi-Namur to Tutuila, Star Fish -----	140
A.13 Roi-Namur to Viti Levu, Star Fish -----	142
A.14 Roi-Namur to Rarotonga, Star Fish -----	144
A.15 Roi-Namur to Midway, Star Fish -----	146
A.16 Kauai to Tutuila, Star Fish -----	148
A.17 Roi-Namur to Palo Alto, Star Fish -----	150
A.18 Okinawa to Hawaii, Star Fish -----	152
A.19 Canton to Palo Alto, Star Fish -----	154
A.20 Kauai to Fairbanks, Star Fish -----	156
A.21 Kauai to Rarotonga, Star Fish -----	158
A.22 Roi-Namur to Wake, Star Fish -----	160
A.23 Roi-Namur to Fairbanks, Star Fish -----	162
A.24 Kauai to Palo Alto, Star Fish -----	164
A.25 Okinawa to Palo Alto, Star Fish -----	166
A.26 Okinawa to Tutuila, Star Fish -----	168
A.27 Okinawa to Fairbanks, Star Fish -----	170
A.28 Roi-Namur to Hawaii, Check Mate -----	172
A.29 Roi-Namur to Kauai, Check Mate -----	174
A.30 Canton to Fairbanks, Check Mate -----	176
A.31 Canton to Midway, Check Mate -----	178
A.32 Kauai to Wake, Check Mate -----	180
A.33 Kauai to Midway, Check Mate -----	182

A.34	Canton to Hawaii, Check Mate	184
A.35	Canton to Wake, Check Mate	186
A.36	Canton to Viti Levu, Check Mate	188
A.37	Canton to Tutuila, Check Mate	190
A.38	Canton to Rarotonga, Check Mate	192
A.39	Roi-Namur to Tutuila, Check Mate	194
A.40	Roi-Namur to Viti Levu, Check Mate	196
A.41	Roi-Namur to Rarotonga, Check Mate	198
A.42	Roi-Namur to Midway, Check Mate	200
A.43	Kauai to Tutuila, Check Mate	202
A.44	Roi-Namur to Palo Alto, Check Mate	204
A.45	Okinawa to Hawaii, Check Mate	206
A.46	Canton to Palo Alto, Check Mate	208
A.47	Kauai to Rarotonga, Check Mate	210
A.48	Roi-Namur to Wake, Check Mate	212
A.49	Roi-Namur to Fairbanks, Check Mate	214
A.50	Okinawa to Tutuila, Check Mate	216
A.51	Roi-Namur to Hawaii, Blue Gill	218
A.52	Roi-Namur to Kauai, Blue Gill	220
A.53	Canton to Fairbanks, Blue Gill	222
A.54	Canton to Midway, Blue Gill	224
A.55	Kauai to Wake, Blue Gill	226
A.56	Kauai to Midway, Blue Gill	228
A.57	Canton to Hawaii, Blue Gill	230
A.58	Canton to Tutuila, Blue Gill	232
A.59	Roi-Namur to Tutuila, Blue Gill	234
A.60	Roi-Namur to Rarotonga, Blue Gill	236
A.61	Roi-Namur to Hawaii, King Fish	238
A.62	Roi-Namur to Kauai, King Fish	240
A.63	Canton to Fairbanks, King Fish	242
A.64	Canton to Midway, King Fish	244
A.65	Kauai to Wake, King Fish	246
A.66	Kauai to Midway, King Fish	248
A.67	Canton to Hawaii, King Fish	250
A.68	Canton to Wake, King Fish	252
A.69	Canton to Viti Levu, King Fish	254
A.70	Canton to Tutuila, King Fish	256
A.71	Canton to Rarotonga, King Fish	258
A.72	Roi-Namur to Tutuila, King Fish	260
A.73	Roi-Namur to Viti Levu, King Fish	262
A.74	Roi-Namur to Rarotonga, King Fish	264
A.75	Roi-Namur to Midway, King Fish	266
A.76	Kauai to Tutuila, King Fish	268
A.77	Roi-Namur to Palo Alto, King Fish	270
A.78	Okinawa to Hawaii, King Fish	272
A.79	Canton to Palo Alto, King Fish	274
A.80	Kauai to Fairbanks, King Fish	276
A.81	Kauai to Rarotonga, King Fish	278
A.82	Roi-Namur to Wake, King Fish	280
A.83	Roi-Namur to Fairbanks, King Fish	282

A.84	Kauai to Palo Alto, King Fish-----	284
A.85	Okinawa to Tutuila, King Fish-----	286
A.86	Roi-Namur to Hawaii, Tight Rope-----	288
A.87	Roi-Namur to Kauai, Tight Rope-----	290
A.88	Canton to Midway, Tight Rope-----	292
A.89	Roi-Namur to Hawaii, Housatonic-----	294
A.90	Roi-Namur to Kauai, Housatonic-----	296
A.91	Canton to Midway, Housatonic-----	298

FIGURES

1.1	NBA receiver sites for Fish Bowl, showing great-circle propagation paths-----	25
1.2	18-kc-system block diagrams-----	26
1.3	Rustrak strip-chart records of 18-kc signal-----	27
1.4	Polar plot of phasor variation on 7 October at Canton-----	28
1.5	Processed data plot form-----	29
1.6	Diurnal amplitude and phase comparison plots for four consecutive days in July at Okinawa-----	30
2.1	Diurnal amplitude and phase at Palo Alto and Midway, Star Fish-----	43
2.2	Diurnal amplitude and phase at Kauai and South Point, Star Fish-----	44
2.3	Diurnal amplitude and phase at Viti Levu, Star Fish-----	45
2.4	Amplitude and phase detail at Viti Levu and South Point, Star Fish-----	46
2.5	Amplitude and phase detail at Kauai and Tutuila, Star Fish-----	47
2.6	Amplitude and phase detail at Canton and Wake, Star Fish-----	48
2.7	Amplitude and phase detail at Roi-Namur and Midway, Star Fish-----	49
2.8	Amplitude and phase detail at Palo Alto, Star Fish-----	50
3.1	Diurnal amplitude and phase at Okinawa and Midway, Check Mate-----	65
3.2	Diurnal amplitude and phase at Kauai and Tutuila, Check Mate-----	66
3.3	Diurnal amplitude and phase at Canton, Check Mate-----	67
3.4	Diurnal amplitude and phase at Viti Levu, Check Mate-----	68
3.5	Amplitude and phase detail at Canton and Midway, Check Mate-----	69
3.6	Amplitude and phase detail at Okinawa and Kauai, Check Mate-----	70
3.7	Amplitude and phase detail at South Point and Wake, Check Mate-----	71
3.8	Amplitude and phase detail at Rarotonga and Palo Alto, Check Mate-----	72
3.9	Amplitude and phase detail at Tutuila and Viti Levu, Check Mate-----	73
3.10	Amplitude and phase detail at Roi-Namur, Check Mate-----	74
4.1	Diurnal amplitude and phase at Okinawa, Blue Gill-----	88
4.2	Diurnal amplitude and phase at Palo Alto and Wake, Blue Gill-----	89
4.3	Diurnal amplitude and phase at Kauai and South Point, Blue Gill-----	90
4.4	Diurnal amplitude and phase at Roi-Namur and Tutuila, Blue Gill-----	91

4.5 Amplitude and phase detail at Tutuila and Okinawa, Blue Gill-----	92
4.6 Amplitude and phase detail at Roi-Namur and Viti Levu, Blue Gill-----	93
4.7 Amplitude and phase detail at Palo Alto and Wake, Blue Gill -----	94
4.8 Amplitude and phase detail at Kauai and South Point, Blue Gill-----	95
4.9 Amplitude and phase detail at Midway, Blue Gill -----	96
5.1 Diurnal amplitude and phase at Wake, King Fish -----	108
5.2 Diurnal amplitude and phase at Kauai and South Point, King Fish -----	109
5.3 Diurnal amplitude and phase at Viti Levu, King Fish -----	110
5.4 Amplitude and phase detail at Fairbanks and Viti Levu, King Fish -----	111
5.5 Amplitude and phase detail at South Point and Kauai, King Fish -----	112
5.6 Amplitude and phase detail at Roi-Namur and Tutuila, King Fish -----	113
5.7 Amplitude and phase detail at Wake, King Fish -----	114

PART 2

18-KC PHASE AND AMPLITUDE (U)

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CHAPTER 1

INTRODUCTION

One of the most sensitive measures of a change in electron content in the lowest portions of the ionosphere is the received phase of a VLF signal. Such measurements have been used for years to monitor sudden ionospheric disturbances (SID) in the lower ionosphere. Phase differences equivalent to a change of a few electrons per cm^3 or an effective ionospheric height change of less than 1 km can be detected.

Project 6.11 had, as a requirement, a frequency standard with stabilities of the order of a few parts in 10^{10} to be used as a time signal source at each terminal in the HF sounder program. These standards were kept on frequency by monitoring the 18-kc time-and-frequency-standard signal radiated from the U.S. Navy Transmitting Station, NBA, Balboa, Canal Zone. To synchronize the local-standard frequency with the 18-kc signal from NBA, the received phase of NBA was compared on a day-to-day basis with the local standard. Corrections to the local standard were made manually, based on several days' measurements. The system required for recording the received phase of NBA also contains data on the change in phase at the time of the Fish Bowl events. This report describes these measurements.

Twelve sites in the Pacific basin were installed under Project 6.11 to monitor the phase and amplitude of NBA signal. These sites and the great-circle distance from NBA to each site are shown in

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frequency standard. Since the IF inputs to the two synchronous detectors were in quadrature, the outputs, called X and Y, were:

$$\text{Output X} = A \sin \phi$$

$$\text{Output Y} = A \cos \phi,$$

where A was proportional to the amplitude of the incoming NBA signal and ϕ was the phase angle between the incoming NBA signal and the local standard, this phase comparison being made at 2 kc in this particular design.

The two outputs were recorded on two¹ sets of dc amplifiers and simple Rustrak recorders. One set of recorders ran continuously at 3 inches per hour; the other set ran at 9 or 18 inches per hour at times of interest. Calibration was accomplished by injecting a signal at a frequency within $1/2$ cps² of the signal from NBA and recording the peak-to-peak deviation on each of the two recorder channels. This peak-to-peak deviation represents twice the input amplitude. This calibration procedure was used at three signal levels to ensure

¹Only one set of recorders is shown in Figure 1.2. At some sites, two-track recorders were used and at others two single-track recorders were used for each set.

²During normal operation, detector time constants of 2 to 4 seconds were used. During calibration, a time constant of 0.1 second was used, thus requiring the calibration signal to be within $1/2$ cps of the system center frequency.

linearity and equal gain through the system for both the X- and Y- outputs. Absolute field-strength measurements were not attempted, although measurements were made on the antenna and pre-amplifier that could be used to determine field strength.

The output records for 3-inch-per-hour recording speed are shown in Figure 1.3. The upper two records are the output recordings from a single-track recording system (two recorders per set); the lower record is from a dual-track recording system. Figure 1.3 shows several features pertinent to the phase and amplitude recording system. NBA transmits a 0.3-second pulse each second, with some missing pulses toward the end of each hour for identification of time. With the 2- to 4-second time constant in the system, the average amplitude (approximately 0.3 of the peak-pulse amplitude) is displayed on the recorder. From 4 to 7 minutes past each hour, NBA radiates a continuous signal. This key-down signal shows as a pulse each hour on the records in Figure 1.3. Following the key-down, no signal is transmitted from 7 to 10 minutes past each hour. This key-up gives a zero input following each key-down. By using the key-up level as zero, the amplitudes at the key-down periods can be seen to vary both positively and negatively. This change in signal polarity is caused by a changing phase between the incoming NBA signal and the local frequency standard.

The amplitude and phase data shown in the upper two graphs of Figure 1.3 can be separated as shown in Figure 1.4, which is an

orthogonal plot of the X and Y-outputs of the key-down times. The amplitude, A, which is the distance from the origin to the point X, Y, is

$$A = (X^2 + Y^2)^{1/2}.$$

The phase, Φ , which is the angle from the positive X axis to the vector to the point X, Y, is

$$\Phi = \tan^{-1} \frac{Y}{X}.$$

The hourly values of X and Y obtained from the key-down signals are shown in Figure 1.4 along with a smooth curve through the points and represent the phase-amplitude behavior of the two records shown at the top in Figure 1.3. No identification sequence was recorded at 1100 GMT on 7 October. In such cases, the signal was read with respect to a line through the zero levels on either side, and magnitudes were adjusted in the ratio of $\frac{10}{3}$ to correspond to the other data. For normal data processing, calculations of A and Φ were made without the visual display shown in Figure 1.4. For records whose calibrations showed a difference of over 10 percent in recorded amplitude between X and Y, Y was normalized to X before calculating A and Φ .

Data to provide background information were read continuously from the records gathered between 1 July and mid-November, wherever possible. Readings were taken from the hourly periods of continuous-wave signal and referenced to the zero level immediately following, in the transmitter sequence (see Figure 1.3); magnitudes were read in the arbitrary units printed on the record tapes. The traces were

examined in the intervals between readings to determine direction of phase variation. These quadrature-component readings were then converted to phase and amplitude, and plots were made showing phase angle (containing both propagation-phase variations and local-oscillator drift) vs. Greenwich Mean Time (GMT) for consecutive diurnal periods. Figure 1.5 shows such a plot of phase in the upper graph.

In order to compare diurnal phase variations between respective days, it was necessary to remove from the phase data the average oscillator drift-slope for each day. This was done by assuming that ionospheric conditions would be repeatable during the hours near midpath midnight (0905 GMT for the data shown in Figure 1.5) and by connecting the phase points at this time on each consecutive day by a straight line (see Figure 1.5, upper curve). Theoretically, such lines should be chords between points on a parabolic arc representing oscillator output, in cycles, vs. time; but as there is some ionospheric effect at midpath midnight (especially over the northern paths in summer), this method gives only a first approximation of the average drift-slope over each day. Whenever anomalies occurred in any diurnal period (e.g., long off-periods, changes to receiver equipment, or nuclear-test events), the method followed in establishing slopes for that period was to bypass the affected day and re-establish slope variation on the first day following for which complete data were available. It was usually possible to extrapolate backward and forward in time well enough to estimate slope behavior, unless the oscillator drift was high (12 cycles per day or more).

Whenever it could be discerned that adjustment had been made to the frequency standard that was used as the local oscillator for the NBA receiver, a new slope-variation pattern was sought and established, if possible, in the phase data for the subsequent period. It was assumed that no other occurrence could cause a change in the pattern of daily drift-slope variation.

In the case of nuclear test events, it was always possible to work backward in time to establish a reasonable drift-slope variation through the affected day, provided data existed. In many cases, this meant assuming that a one-cycle phase advance occurred shortly after the event, too rapid to be shown by the data system. Whenever an event occurred in close proximity to and ahead of the midnight phase point, points prior to H-hour were used to orient the drift-slope, unless the average of the background phase-characteristic curves indicated that such a procedure was invalid. In the latter case, and when midnight points were taken a number of hours after H, a 2-day average was used to estimate the slopes for the days affected.

Once drift-slope variation had been established for a number of consecutive days, normalized curves of the diurnal phase variation from midpath midnight to midpath midnight were drawn, by plotting the difference between the raw phase points and the average drift-slope at each hour of the day. Diurnal plots of phase, as shown in the lower curve of Figure 1.5, were made for each path, giving a good indication of the average diurnal phase-characteristic curve. A typical diurnal-phase plot is shown in the

lower curve of Figure 1.6. The spread in phase values at a number of different times of day throughout this diurnal phase plot gives an idea of the validity of assuming repeatable ionospheric effect at midpath midnight. Amplitudes were also compared in this manner, as shown by the upper curves in Figure 1.6. The gaps in the curves are periods for which no usable data were obtained. Such plots, showing days before, after, and including events were made for this report. Amplitudes sometimes appear on these plots without corresponding phase data; phase was considered invalid in such cases because of extremely low signal or because of recent oscillator adjustments.

Records were read in more detail at periods near event time, in order to facilitate establishment of drift-slope variations and to show the post-event phase variations that were resolved by the system. These phase points were added to the raw data curves. By following phase variation backward in time, then, evidence of a recovery from some advanced phase-shift position was apparent in many instances. If, in such cases, drift-slope variation through the period affected by the event could only be made to fit the proper oscillator-drift pattern by assumption of a large post-event phase advance, the phase-characteristic curves were adjusted accordingly, and the shift was incorporated into the raw data at

H + 0 minutes.³

Plots of raw phase detail were then made on an expanded time scale, normalized to the drift-slopes established as discussed above, and compared to the diurnal phase curves for the period immediately surrounding the time of the event. Whenever the normalized diurnal phase characteristics taken within a week of the event showed an average grouping for the hours of interest (H - 1 to H + 3 hours), a median curve was selected. The difference between this median background curve and the normalized phase-detail curve for the event was then plotted, to show the deviation in phase from normal caused by the event. These phase-deviation curves are not labeled as such; any detail phase curve that is unlabeled represents the change from normal phase variations that is caused by the particular event. In a few instances, it was possible to establish reasonable drift-slope variation in spite of irregular appearance of the diurnal characteristic curves, but comparison of event effects

³Important Note: The terms H - 0 and H + 0 minutes, used throughout this report, refer to the last point of a record trace recognizable as being before the event and to the first point that is definitely after the event, respectively. The average response time of the data system used was near 0.2 minute, so that data correlate within about ± 0.2 minute among the records from the different sites and within about ± 0.1 minute of real time in each separate instance.

with background curves did not seem valid because of such irregular behavior. Such phase-detail data are shown with the local standard drift removed and are labeled "Normalized Phase." A third class of detail phase curves is presented. These represent periods for which very few data other than those showing the immediate effects of the event are available, so that it was not possible to establish a drift-slope for the day of the event. These curves, showing data based on the minimum of evidence in the form of the data obtained directly from the X- and Y-records, are labeled "Raw Phase." When a phase advance is shown on one of the Raw Phase detail plots, it has usually been inserted by the analyst in lieu of his other choice: that of showing a retardation in phase caused by the event. Readers should be cautious of accepting these as representing evidence on a par with other data presented, although there are a few exceptions which will be explained in the discussion of the events.

Diurnal amplitude data and detailed amplitude data without normalization are shown for each event. Key-down values are reduced to 0.3 amplitude for direct comparison with non-key-down data. The amplitude data are presented to show the change in amplitude, and not absolute values.

The data-reduction method outlined above was used to obtain background data for the entire period 1 July through 16 November 1962 and to obtain more detailed data showing variations, if present, through the event times indicated in Table 1.1. If records taken at

event time showed no abnormal variation, detailed investigation was not made, but drift-slope variation was checked for consistency.

The results obtained for the periods of interest are presented in the following sections, in the order of events shown in Table 1.1.

The discussion of results assumes the following general approach:

- (1) Diurnal Amplitude data are presented for a number of days in the event-related period. Scales are shown with each of these curves, but they are relative to individual system parameters, and should not be used for any quantitative comparison between sites or events.
- (2) Diurnal Phase data are presented for the same period as amplitude data. The phase curves have been normalized to the daily average oscillator drift-slope to allow comparison; the scales, in radians, are oriented to the drift-slope as zero. Phase advance is shown in a negative direction.
- (3) Amplitude Detail is presented for a 140-minute period at event time. Scales shown are the same as those shown for diurnal amplitude data. Variations in the data are discussed in reference to pre-event conditions, with the pre-event level called unity.
- (4) Detailed Phase data are also presented for the 140-minute period at event time. In discussion of details, phase changes are described in reference to pre-event conditions, that is, the change in radians from pre-event value. The scale, in

radians, has an arbitrary zero reference; phase advance is shown as a negative shift. Phase detail plots are shown in one of three forms:

- (a) Phase Deviation represents the difference between the event data and an average of the characteristic curves during the event-related period. Strict comparison cannot usually be made between these curves and the diurnal phase curves for the same period. These plots represent phase change with respect to average background. They are not labeled in the figures.
- (b) Normalized Phase plots have been used when deviation comparisons could not be made. These curves represent data in the same form as used in the diurnal phase plots and are labeled.
- (c) Raw Phase data, presented when no usable background data was obtained, are shown to demonstrate the presence of event effects. Variation in these curves includes the oscillator drift.

TABLE 1.1

FISH BOWL EVENT NAMES AND TIMES

<u>Name</u>	<u>Date</u>	<u>Time</u> <u>GMT</u>
Star Fish	9 July	0900:09
Check Mate	20 October	0830:00
Blue Gill	26 October	0959:48
King Fish	1 November	1210:06
Tight Rope	4 November	0730:00

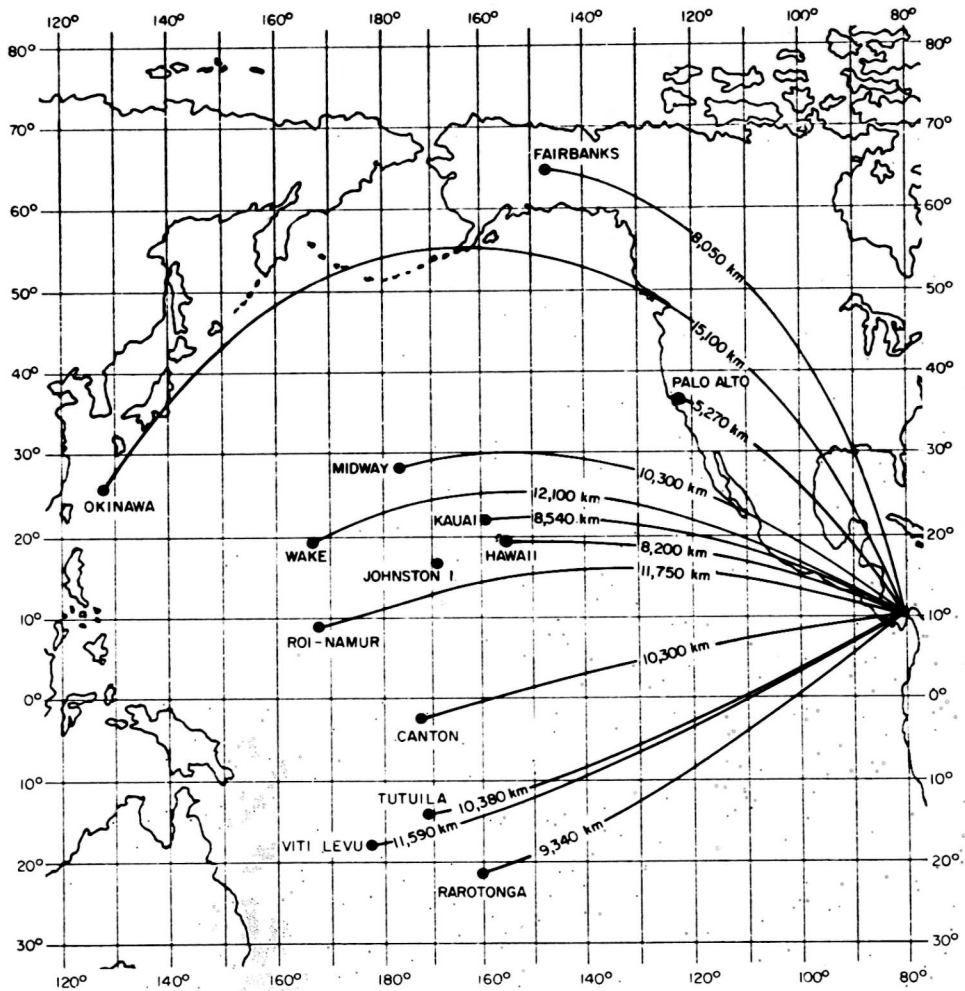


Figure 1.1 NBA receiver sites for Fish Bowl, showing great-circle propagation paths.

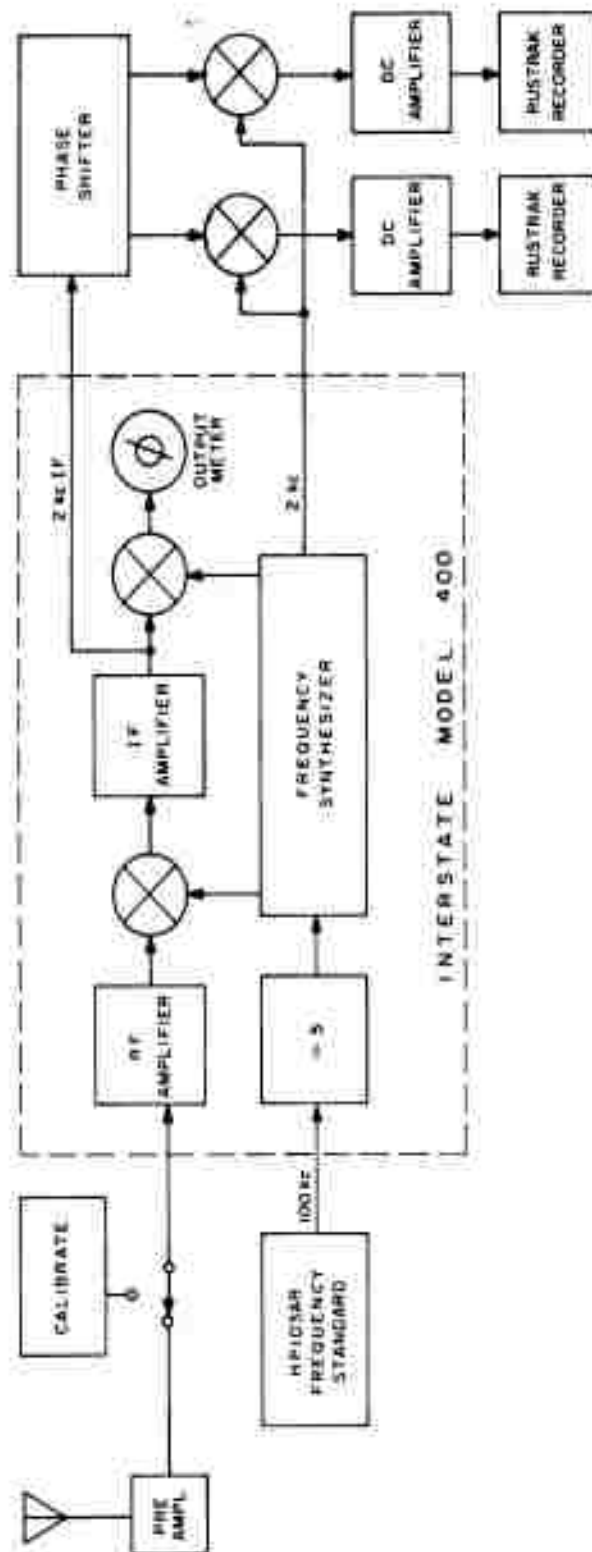
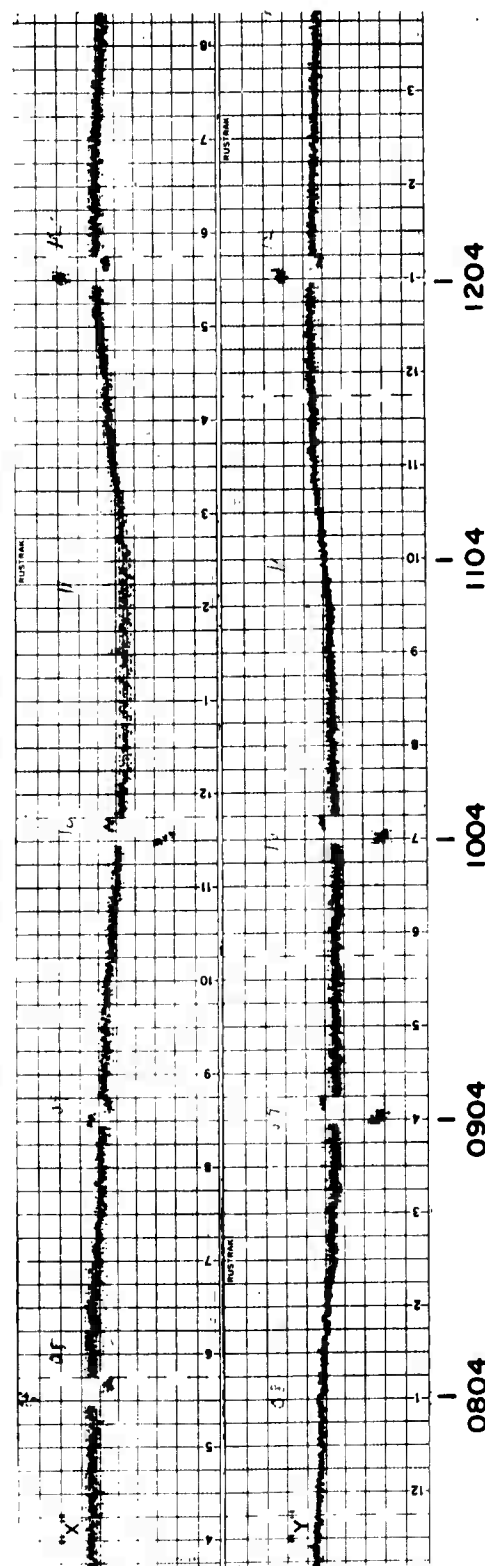


Figure 1.2 18-kc-system block diagrams.

CANTON 7 OCTOBER 1962 0800 - 1200 GMT



ROI-NAMUR 1 NOVEMBER 1962 0100 - 0600 GMT

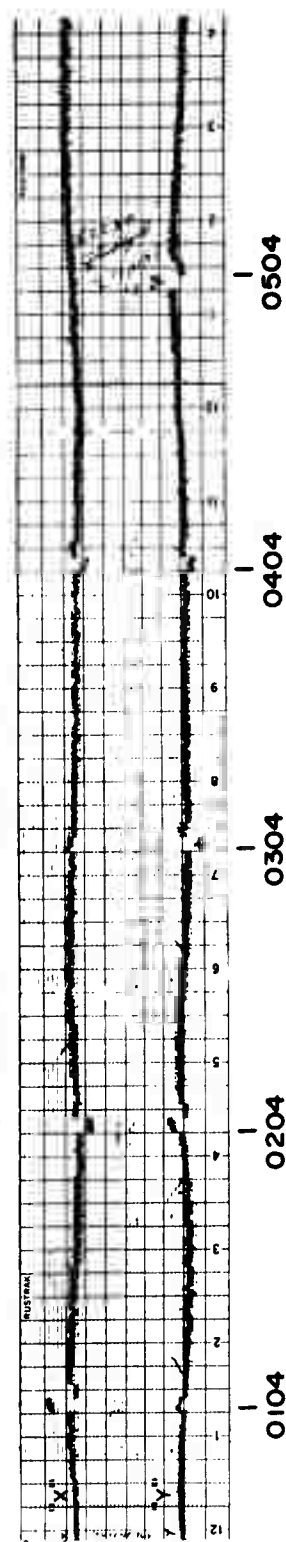


Figure 1.3 Rustrak strip-chart records of 18-kc signal.

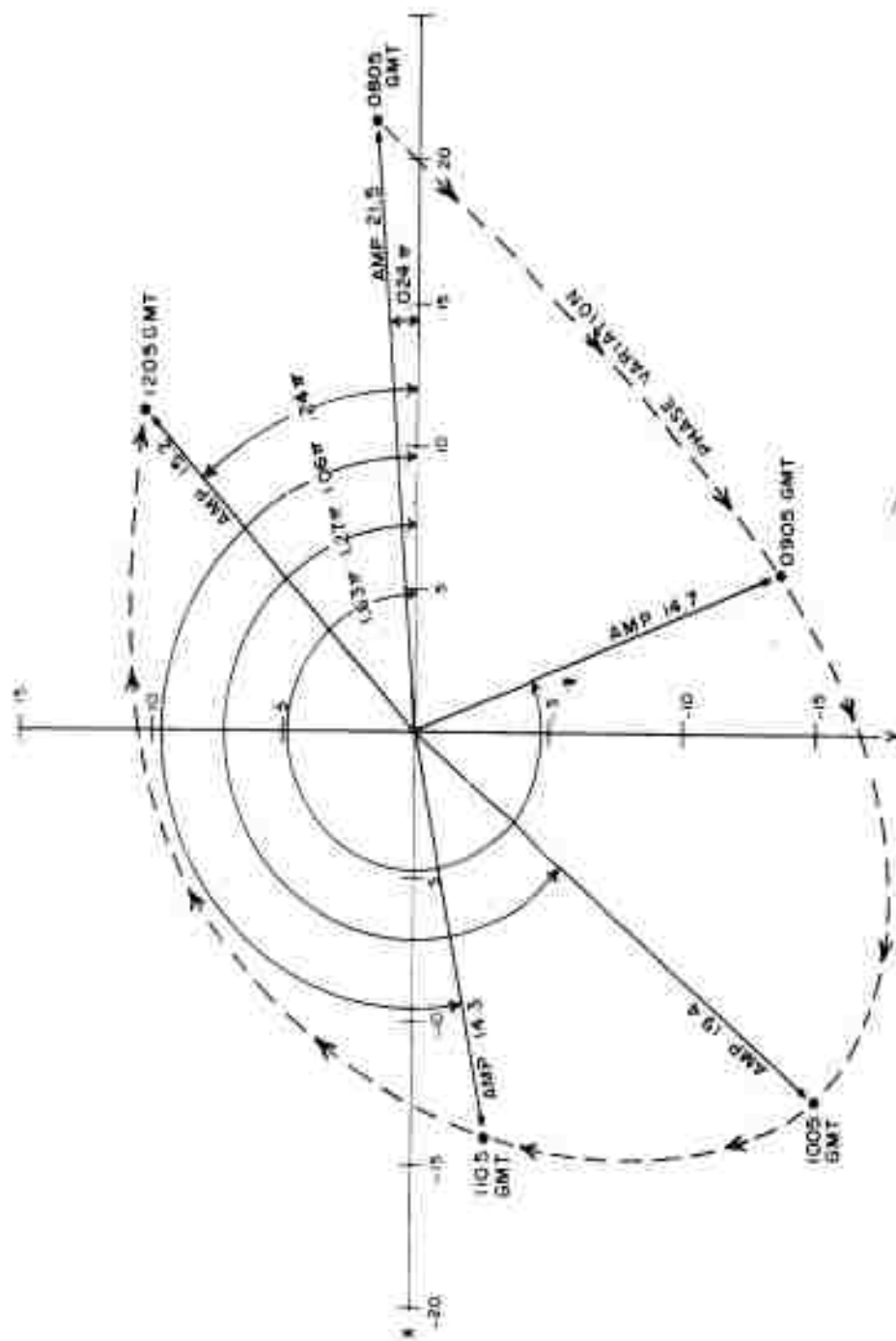


Figure 1.4 Polar plot of phasor variation on 7 October at Canton.

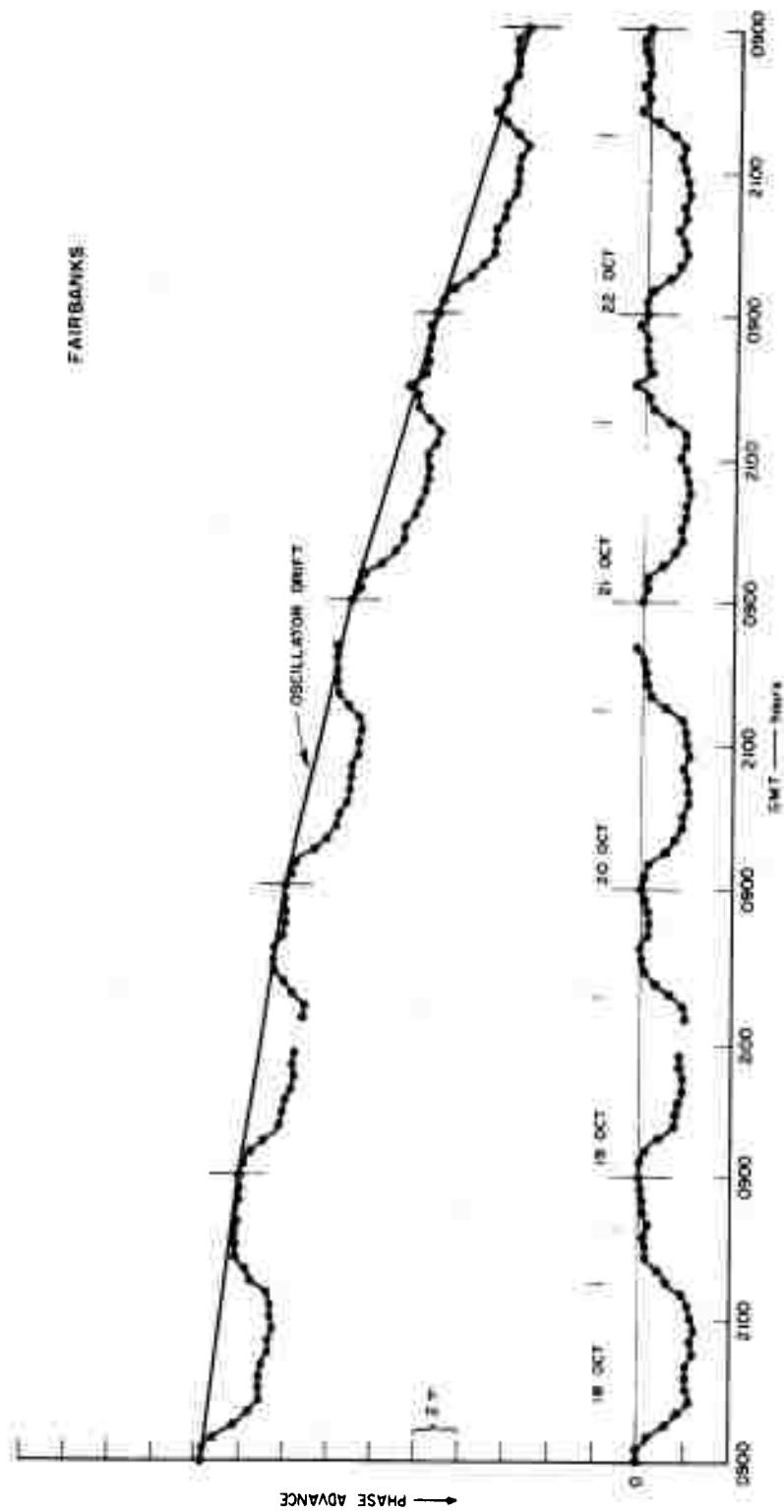


Figure 1.5 Processed data plot form.

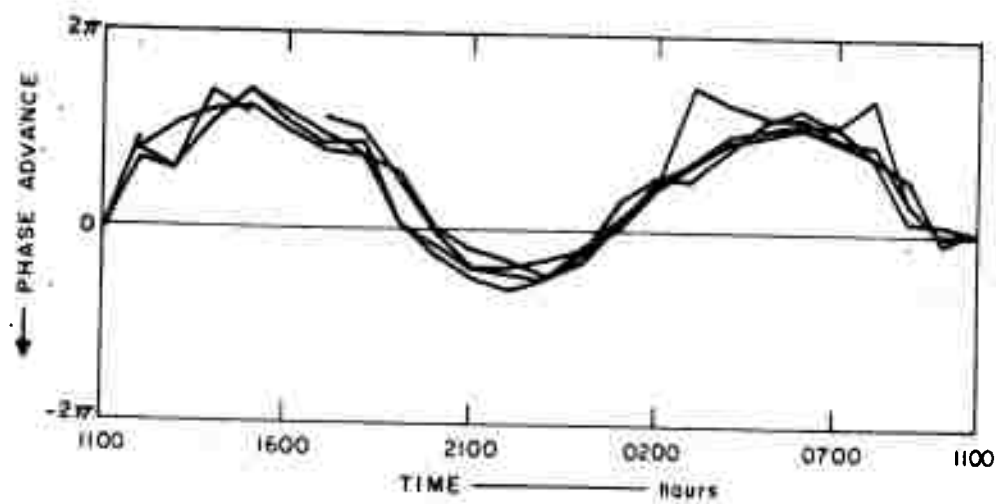
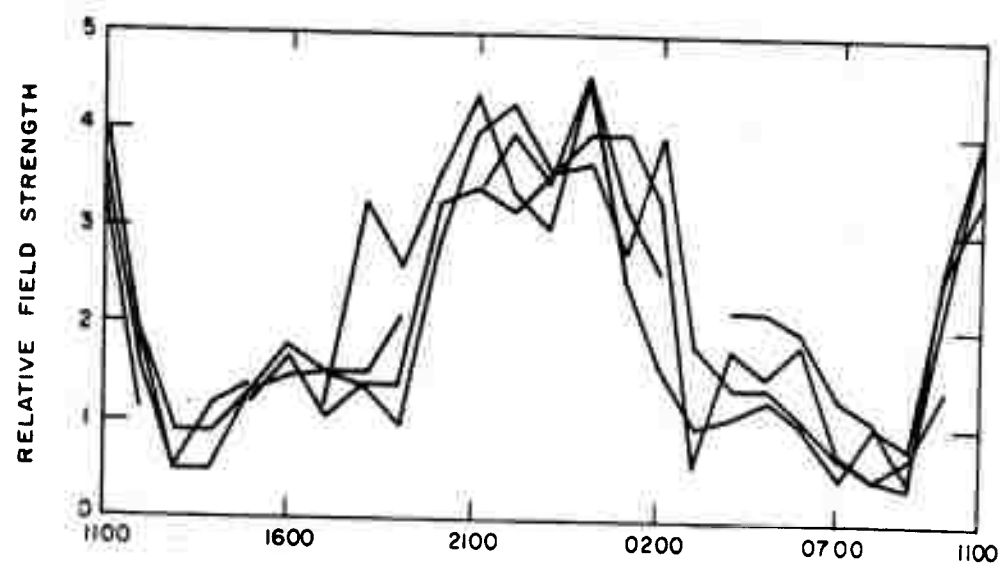


Figure 1.6 Diurnal amplitude and phase comparison plots for four consecutive days in July at Okinawa.

CHAPTER 2

STAR FISH

2.1 GENERAL

For the Star Fish event on 9 July 1962, records were obtained at all sites shown in Figure 1.1 except Fairbanks, Okinawa, and Rarotonga. Data were obtained at the remaining nine sites, with all sites noting effects of the event. Figures 2.1, 2.2, and 2.3 show diurnal phase and amplitude data; Figures 2.4 through 2.8 show phase and amplitude details from 20 minutes before until 2 hours after the event. (Figures are given at the end of the section. The order of presentation has no significance.)

The Star Fish event occurred at 0900:09 GMT on 9 July 1962. Ground sunrise at NBA was at 0949 GMT, so that for some 50 minutes after the event all paths were in darkness. From 0904 to 0907, NBA transmitted a CW signal, then was off from 0907 to 0910, a sequence repeated at hourly intervals. For the remaining time, NBA was transmitting time pulses with a 0.3 duty cycle.

2.2 PALO ALTO

The diurnal amplitude and phase variations of the NBA signal as received at Palo Alto are shown in Figure 2.1 (top). Three consecutive days about the event day are represented. For the NBA-to-Palo Alto path, midnight was taken to be at 0800 GMT, about one hour late. The amplitude curves show good conformity with a slight diurnal variation,

being higher through the morning hours. The spread at 1300 is unexplained; however, ground sunrise at Palo Alto occurs at about 1300 GMT. On the day of the event, amplitude was slightly high just prior to the event, was attenuated significantly at event time, recovered to normal within a few minutes, and remained essentially normal throughout the day.

The diurnal phase curves show fairly close conformity if the phase change at the event is assumed to be as shown. The curve for 10 through 11 July is close to an average for the period near the event. The event-day phase curve does not deviate significantly from normal except for the period H to $H + 30$ minutes, when it undergoes an abnormal advance. The diurnal phase data shown in Figure 2.1 tend to indicate that the midday change in phase is reduced on event day and has partially returned on the following day. However, the data at Palo Alto for Star Fish are very limited, and such conclusions must be doubted.

Phase deviation and amplitude details at Palo Alto are shown in Figure 2.8 for the period around event time. An erratic variation occurs in both curves just prior to H (event time); this is probably attributable to noise. In terms of average amplitude level prior to H , the amplitude curve shows immediate attenuation to 0.5 at H , and further rapid decrease to 0.25 at $H + 0.5$ minute. An immediate increase follows, before $H + 1$ minute, to a comparative level of 0.5; there is another decrease from that point at $H + 1.5$ minutes to 0.25

of the pre-event level. This second minimum in the amplitude corresponds to the rapid phase advance crossing zero, as shown on the phase-deviation curve. Amplitude level then increases very rapidly to 0.75 at $H + 4$ minutes, where constant level is maintained through $H + 1$ hour. There is a slight increase by $H + 2$ hours. The signal amplitude is essentially at normal level after $H + 10$ minutes.

The phase-deviation curve shows an apparent slow retardation from H to $H + 1.5$ minutes of about 0.1π . At $H + 1.5$ minutes, an immediate advance of 0.3π occurs, and continues to 0.6π by $H + 4$ minutes. After the off-period, phase is recovering from 0.7π at $H + 10$ minutes to normal by $H + 1$ hour, at a gradual rate.

2.3 MIDWAY

The diurnal phase and amplitude data for NBA as received at Midway are shown in Figure 2.1 (bottom) for three consecutive days about the event. Midpath midnight is at 0800 GMT. Both the amplitude and phase curves show consistent agreement in diurnal variation, though data are sparsely distributed. The amplitude curve for 9-10 July (event day) averages higher than normal for the hour before the event. There is a large attenuation at H , immediate partial recovery, another period of attenuation near $H + 30$ minutes, and recovery to normal level near $H + 1$ hour; then, signal level follows diurnal variation for the remainder of the day.

The phase curve for 9-10 July had been oriented to show an advance of almost one cycle at H , bringing the curve into near coinci-

dence with the background by $H + 3$ hours, and showing close correspondence with the normal diurnal variation for the remainder of the day. Sunrise effect predominates over event effect by $H + 2.5$ hours.

Details of phase deviation and amplitude around Star Fish event time at Midway are shown in Figure 2.7. Referenced to the pre-event level, amplitude shows an attenuation to 0.5 immediately at H ; it decreases further to less than 0.1 at $H + 1$ minute, and to about 0.05 at $H + 2$ minutes. There is a general increase to about 0.5 at $H + 6$ minutes, where the level remains until after $H + 13$ minutes. Gradual attenuation to 0.2 at $H + 25$ minutes follows; then, signal level increases slowly toward 0.9 at $H + 2$ hours. Recovery to normal level has essentially occurred by $H + 1.5$ hours.

The phase-deviation curve in Figure 2.7 shows an advance of 1.8π at H , and rapid recovery from there to about 1.0π at $H + 13$ minutes. Recovery is checked at 1.0π until $H + 25$ minutes, then continues gradually through 0.8π at $H + 1$ hour and 0.6π at $H + 2$ hours, becoming complete by about $H + 3$ hours.

2.4 KAUAI

The diurnal phase and amplitude data for three consecutive days about the Star Fish event time for Kauai are shown in Figure 2.2 (top). The curves show good agreement in both cases, except for a few hours of the day. Midpath midnight is taken as occurring at 0900 GMT. Diurnal effects shown in the amplitude data are slight, with the signal exhibiting greater variations during the hours of darkness.

The event-day amplitude curve shows large attenuations at H and H + 30 minutes with apparent recovery between, and low signal, on the average, from H to H + 3 hours. There is considerable scattering of the readings in the interval H + 1 to H + 5 hours.

Phase points on the event-day curve are scattered following the event. The phase advance of event time persists until the sunrise effect at about H + 4 hours. The phase variation approaches normal by H + 6 hours, although it appears to show some advance over normal until H + 14 hours.

Figure 2.5 shows details of phase deviation and amplitude through the Star Fish event at Kauai. With respect to the pre-event level (average), the amplitude undergoes attenuation to about 0.5 at H; at H + 2 minutes it increases rapidly, reaching about 1.0 by H + 4 minutes, then continues more gradually until it reaches 1.15 by H + 7 minutes. From H + 10 minutes, when signal reappears, until H + 30 minutes, the level drops from 1.0 to 0.4, then rises gradually, on the average, through H + 2 hours.

The initial phase advance appears to be in two stages: Immediately at H, the phase advances by 0.8π ; there is a pause there for about 1 minute; then another rapid advance follows, to 1.4π at H + 4 minutes. This second phase advance is accompanied by the amplitude increase at H + 2 minutes. There is a gradual recovery, starting at H + 2 minutes, to a phase advance of 0.8π at H + 25 minutes. Another advance follows to 1.2π at H + 40 minutes; final recovery begins from there, appearing very gradually.

2.5 SOUTH POINT

The diurnal phase and amplitude variation of NBA as received at South Point is shown in Figure 2.2 (bottom) for three consecutive days about the Star Fish event. Midpath midnight is at 1000 GMT. Amplitude on event day shows a large attenuation, and a final recovery in the first 3 hours after the event. The average during this time is below the diurnal trend of the background signal amplitude; it becomes quite high, compared to the background, between $H + 3$ and $H + 7$ hours, apparently an enhancement of sunrise effect. Signal level begins to follow the usual diurnal trend by about $H + 12$ hours, but the spread in data makes the time indefinite.

The diurnal phase curves show closer grouping; a phase advance is evident from H to $H + 11$ hours, obscuring the normal sunrise effect. Data are missing from $H + 15$ to 24 hours, but conditions seem normal both before and after that period.

Details of amplitude and phase deviation near event time for South Point are shown in Figure 2.4. With reference to the average value before H as unity, amplitude decreases abruptly at H to about 0.3, returns more gradually to about 1.0 by $H + 7$ minutes, and decreases gradually from 1.0 at $H + 10$ minutes to 0.15 by $H + 1$ hour, when final recovery begins.

The initial phase change seems to be in two stages: Phase deviation advances by about 1.2π by $H + 1$ minute, pauses there for 1 minute, then shows a further advance to 1.8π at $H + 3$ minutes. This position

is held until $H + 5$ minutes; then, there is a gradual recovery to 1.4π at $H + 40$ minutes, another advance to 1.8π by $H + 70$ minutes (too early to be sunrise effect), and a very slow final recovery lasting from then until $H + 11$ hours.

2.6 VITI LEVU

The diurnal variations of phase and amplitude are shown in Figure 2.3 for three days about the event at Viti Levu. The day after event is not shown: the data were very doubtful, showing a reversed phase characteristic. Midpath midnight is at 1000 GMT. The amplitude data are so spread that no diurnal variation is readily apparent. The amplitude curve around the time of the event is below the expected level. At event time, there is a sudden attenuation and an early return to about the pre-event level. There is attenuation again at about $H + 3.5$ hours; this may be sunrise effect.

The diurnal phase curves show more conformity than do the amplitude curves, but much scattering is evident. In the phase curve for 9 July, an advance of one cycle has been inserted at H to establish a consistent local-standard drift-slope. The deviation from H until $H + 4$ hours is considerable, obscuring any diurnal effect. Phase does not return to its normal diurnal characteristic until about $H + 10$ hours.

Phase deviation and amplitude details at Viti Levu are shown in Figure 2.4. With the pre-event average level as a reference, the signal amplitude shows attenuation to 0.4 by $H + 0.5$ minute, with a further

drop at $H + 1$ minute, reaching a minimum of about 0.2 by $H + 4$ minutes. By $H + 15$ minutes a comparative level of about 0.75 is reached. This approximate level is maintained toward $H + 2$ hours, with a rising trend then becoming apparent.

Phase change is in three stages, apparently. There is a phase advance of 2.6π immediately after H , pausing there for 0.5 minute, then a very rapid phase advance to a total of 3.2π at $H + 1$ minute, followed by another 0.5-minute pause, and finally a rapid advance to a total of 3.5π at $H + 4$ minutes. There is a rapid recovery between $H + 4$ and $H + 7$ minutes, to 2.6π . At $H + 10$ minutes, there is a gradual advance, reaching 2.9π by $H + 40$ minutes, followed by a slight recovery at $H + 50$ to 65 minutes and a gradual advance lasting until $H + 5$ hours.

2.7 TUTUILA

Diurnal variation is not shown because of the many gaps in the data. Fortunately, there was good agreement for the hours around the event, so that comparison could be made for the detail curve of phase deviation. Phase deviation and amplitude details for Tutuila are shown in Figure 2.5. The phase curve shows an advance of 1.2π at H , a slight recovery to 1.1π between $H + 7$ and $H + 15$ minutes, a gradual advance to 1.4π by $H + 45$ minutes, and a very slow recovery from that point, remaining at almost constant deviation through $H + 2$ hours. Recovery is apparently complete by $H + 7$ hours.

Amplitude changes, referenced to the pre-event average, show an attenuation to 0.35 between H and H + 1 minute, a gradual decrease to 0.15 by H + 5 minutes, a very slow recovery from 0.35 at H + 10 minutes, reaching normal level by H + 65 minutes, after which the curve follows the normal diurnal variation.

2.8 CANTON

For the Star Fish event, data on the received signal from NBA at Canton were very sketchy, so that diurnal behavior and local standard drift could not be determined. Amplitude and raw phase details are shown in Figure 2.6. Referenced to the pre-event average level, the amplitude curve shows attenuation immediately at H, to 0.3, drops to less than 0.1 at H + 1 minute, returns to 0.3 at H + 3 minutes, and falls again to 0.15 at H + 5 minutes. There is a gradual increase to 0.4 by H + 55 minutes, after which data were lost until H + 90 minutes. Signal is at the same level when next seen, and rises to about 1.0 by H + 2 hours, this being approximately the pre-event signal level.

The phase does not advance appreciably until H + 1 minute. The H + 0 reading that corresponds to the sudden signal attenuation, indicates a 0.04π retardation. A rapid advance of 1.6π is recorded at H + 1 minute. (These phase data are assumed to be an advance, otherwise the data would show phase retardation of 0.4π .) Rapid partial recovery is shown, to 1.2π at H + 3 minutes, followed by a continuously advancing phase to more than 2π by H + 1 hour. After

the break in signal recording, phase was apparently beginning to recover, but was still advanced by more than 2π .

2.9 WAKE

At Wake, there were several local-frequency-standard adjustments a few hours prior to the Star Fish event, so at event time the local standard was too unsettled to allow a reasonable estimate of drift-slope. The slope is only known to be positive, and is probably less than 0.2π radian per hour. Therefore, the phase data from NBA recorded at Wake are presented in raw-phase form. Details of amplitude and raw phase are shown in Figure 2.6.

The phase of NBA shows a very rapid advance of 0.5π from H to H + 1 minute, very slight recovery between H + 11 and H + 12 minutes, to about 0.2π , then gradual recovery from H + 12 minutes through H + 2 hours. It is impossible to tell when phase returns to normal in these data, but it has certainly done so by no later than H + 7 hours and possibly as soon as H + 1 hour.

In terms of the level prior to H, amplitude decreases immediately at H, by H + 1 minute has reached 0.25, where it remains until H + 4 minutes, then increases slightly to about 0.3 at H + 7 minutes. The level is seen to be decreasing gradually after the off-period (H + 10 minutes) to a minimum of 0.1 at H + 40 minutes. Thereafter, the average level remains low until H + 7 hours.

2.10 ROI-NAMUR

The phase deviation and amplitude detail data from Roi-Namur are shown in Figure 2.7. The background phase-characteristic curves for the week of the event are very irregular throughout most of the day, showing phase to be retarded at noon in some cases. The drift-slope variation is reasonable, however, and the background is consistent for about 4 hours either side of midpath midnight (0900 GMT), so that it was possible to arrive at phase deviation for the detail-phase curve.

Amplitude variation, relative to the average pre-event level, shows attenuation at $H + 0$ to 0.15, remaining constant at that level from $H + 0$ to $H + 3$ minutes. There is a return in amplitude to 0.5 by $H + 7$ minutes. A rather slow decrease begins at about $H + 25$ minutes, to about 0.3 by $H + 45$ minutes. The low level near 0.3 is maintained as an average until $H + 5$ hours, but there are a number of fades between $H + 2$ and $H + 5$ hours. Signal appears normal by $H + 6$ hours.

Phase deviation advances by 2π at H , then remains essentially constant until $H + 7$ minutes, and has not changed appreciably after the off-period. Partial recovery starts at $H + 16$ minutes, returning to 1.6π at $H + 20$ minutes. After $H + 25$ minutes, the phase gradually returns to normal by $H + 5$ hours.

2.11 SUMMARY

The NBA phase and amplitude recordings at nine sites during the Star Fish event show some general characteristics and some individual phenomena unique to a particular location. The general features are probably fact, while some of the individual differences may or may not be real, due to their magnitude being near the minimum readable signal.

There was an immediate phase advance at all sites except Canton and Palo Alto. This phase advance reached its maximum in one step at Roi Namur, Wake, Midway, and possibly Tutuila. At South Point and Kauai, there were two stages of phase advance, and at Viti Levu, there were three stages of phase advance, all occurring within 3 minutes after the event. At Canton the major phase advance occurred 1 minute after the event. At Palo Alto the phase advance was delayed until 1.5 minutes with an additional slower advance lasting to 4 minutes. These delayed phase advances at the various sites appear to be time related. Recovery of phase in general takes at least 6 hours.

Amplitude of the received signal from NBA showed an immediate attenuation at event time at all sites. This attenuation lasted in general less than 4 minutes before recovery started. At South Point and Kauai, amplitude recovery was complete by 4 minutes, followed, possibly, by a second gradual attenuation of signal. At the other sites, the recovery at 4 to 10 minutes was partial, followed by a gradual recovery in amplitude.

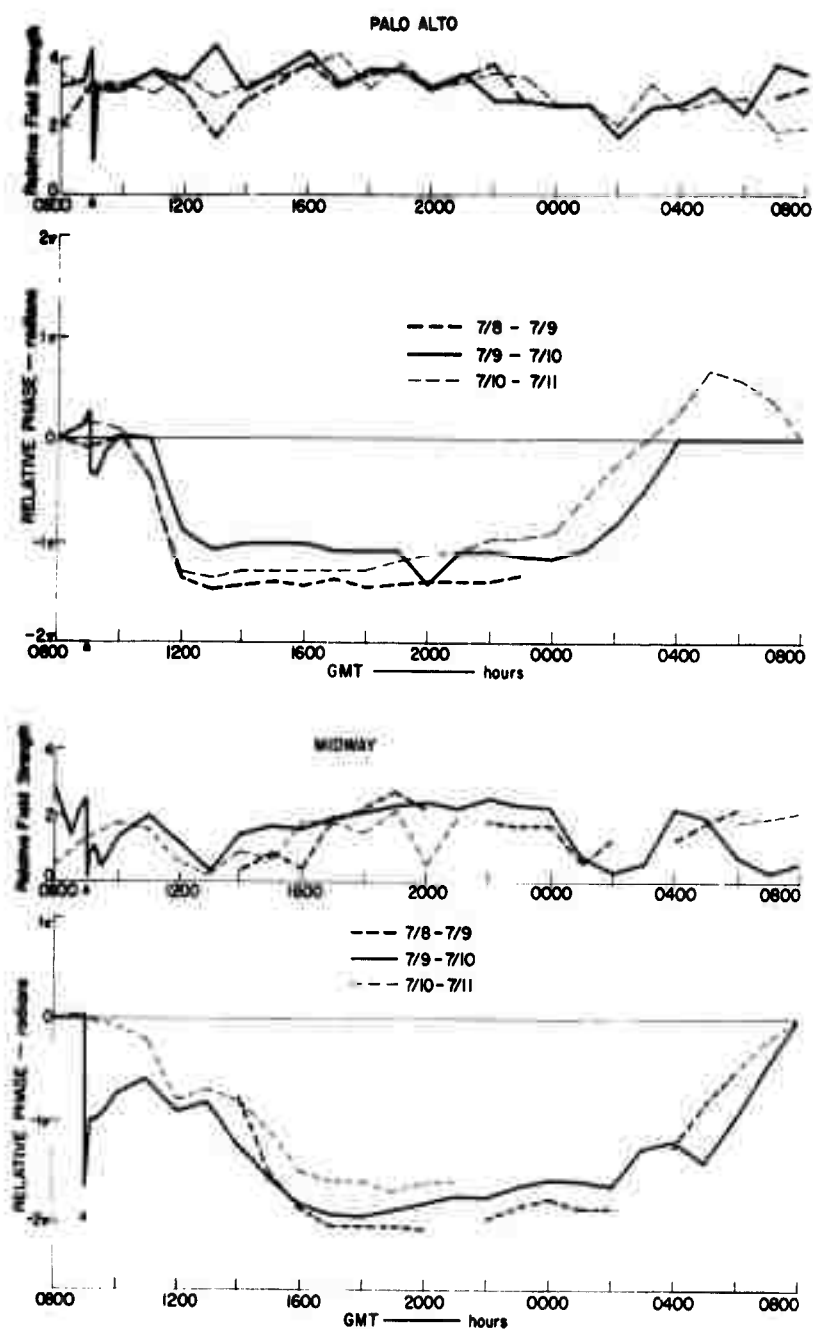


Figure 2.1 Diurnal amplitude and phase at Palo Alto and Midway, Star Fish.

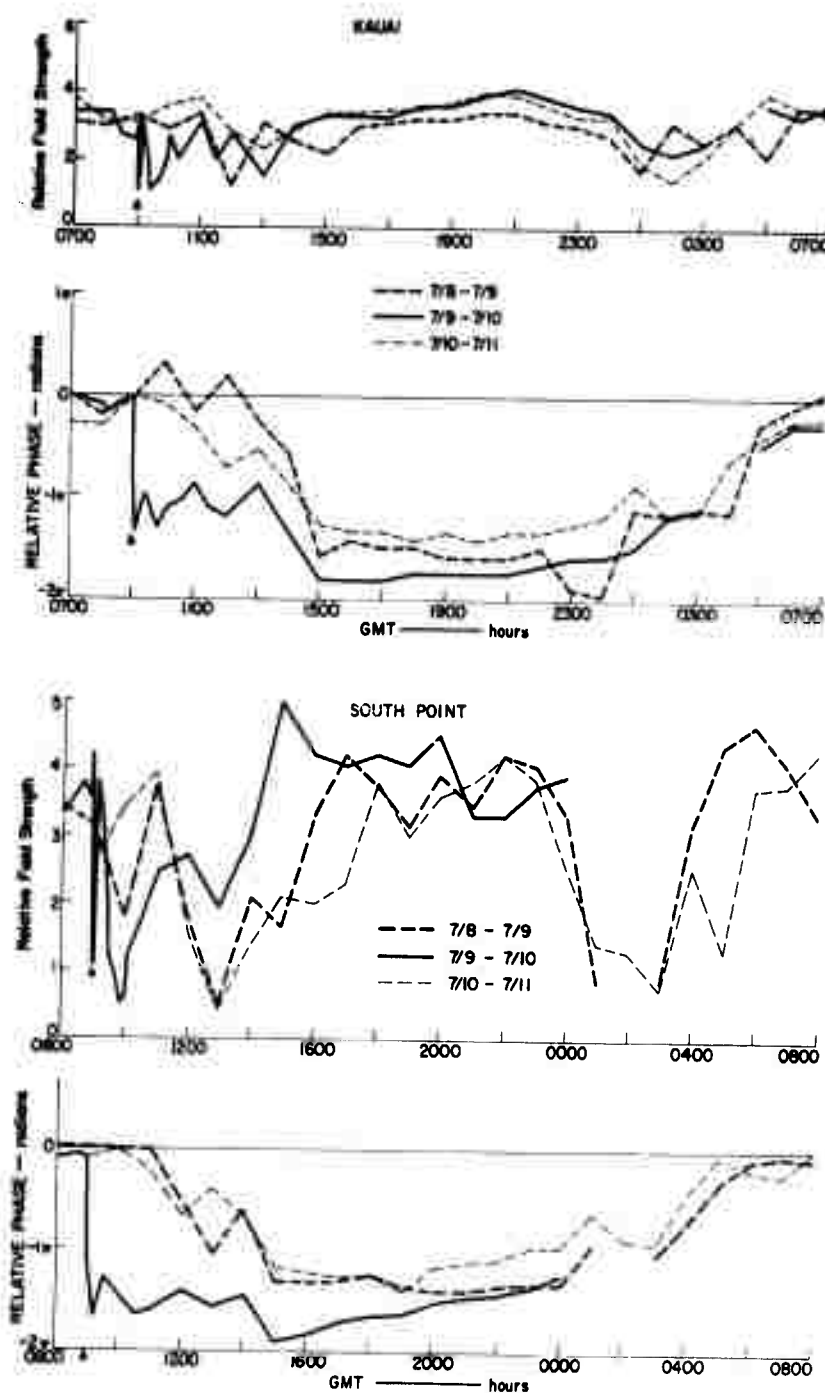


Figure 2.2 Diurnal amplitude and phase at Kauai and South Point, Star Fish.

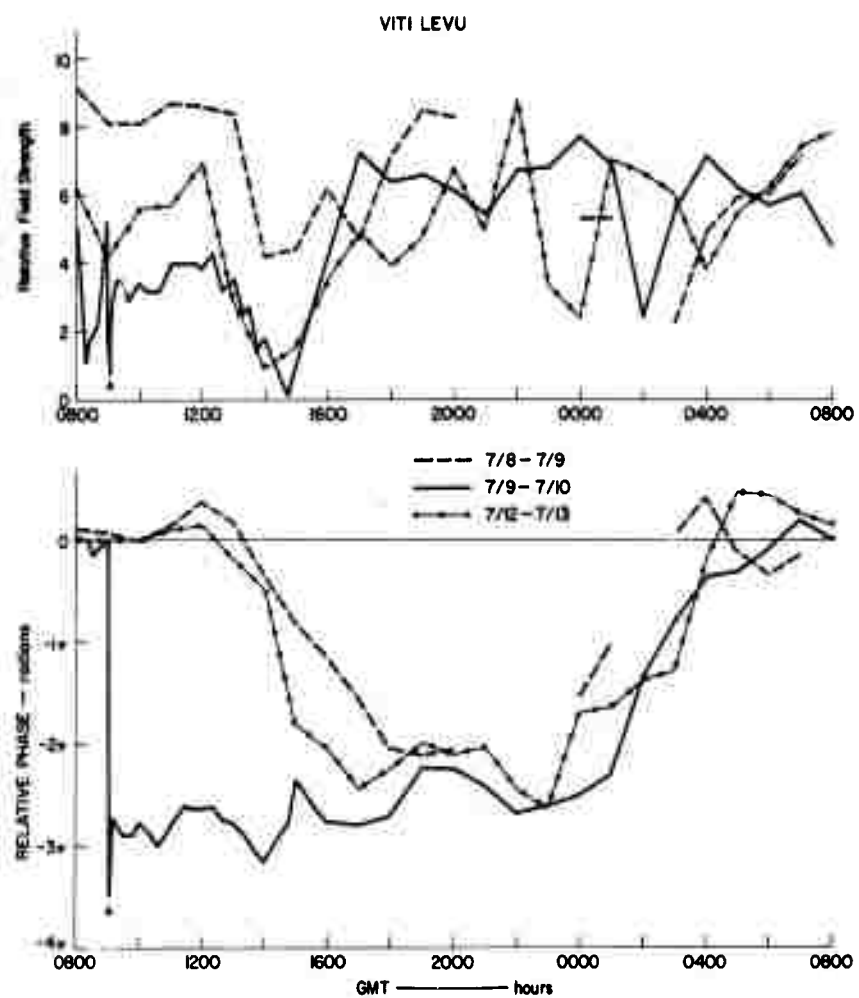


Figure 2.3 Diurnal amplitude and phase at Viti Levu, Star Fish.

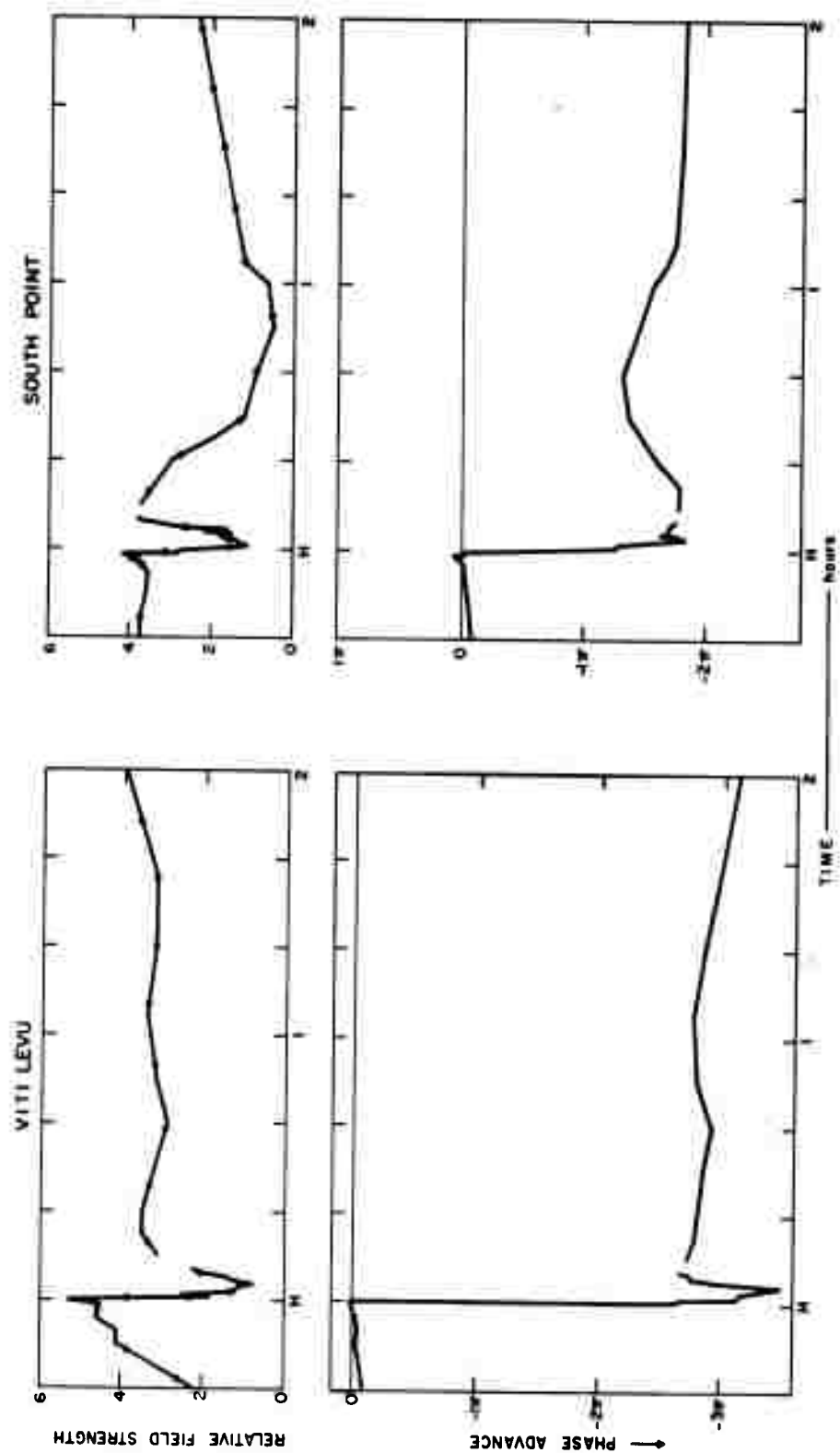


Figure 2.4 Amplitude and phase detail at Viti Levu and South Point, Star Fish.

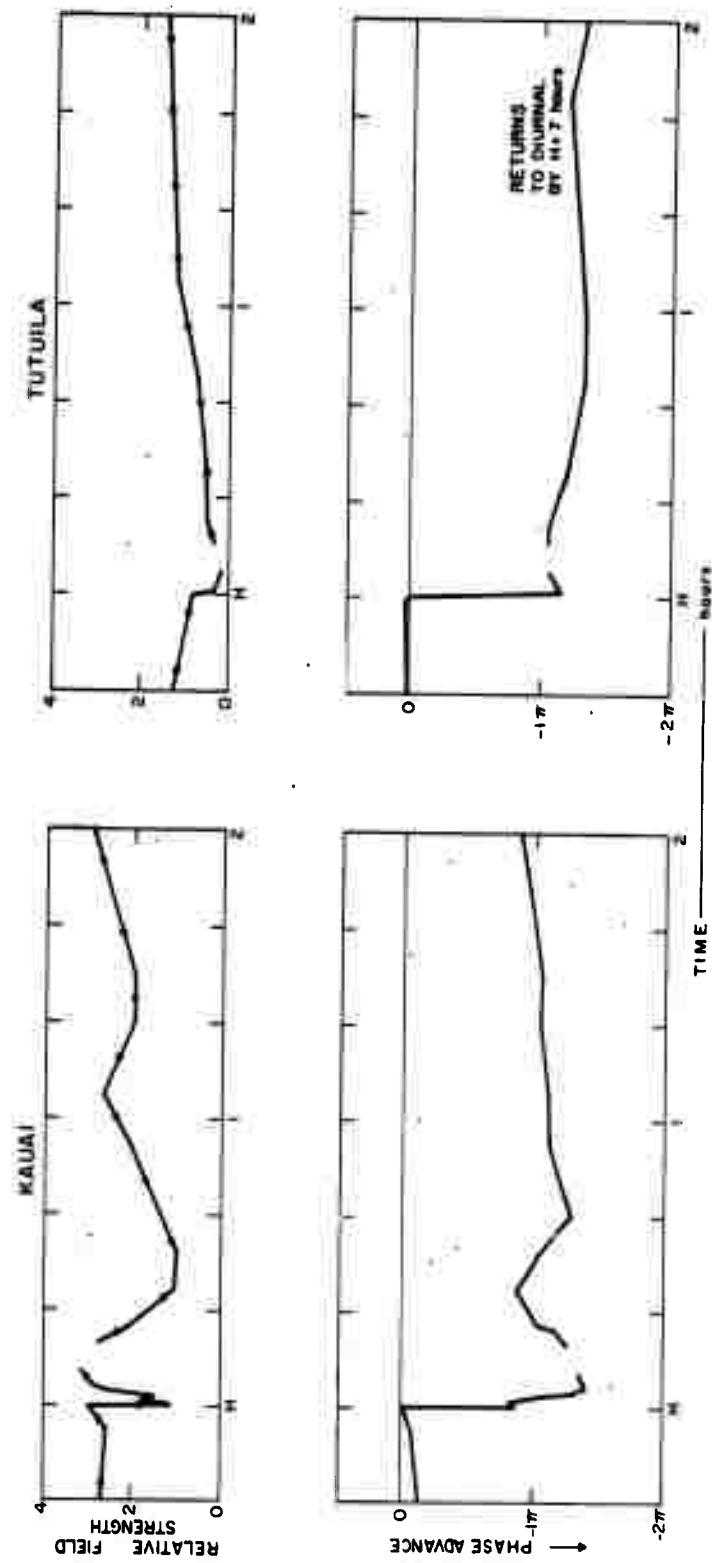


Figure 2.5 Amplitude and phase detail at Kauai and Tutuila, Star Fish.

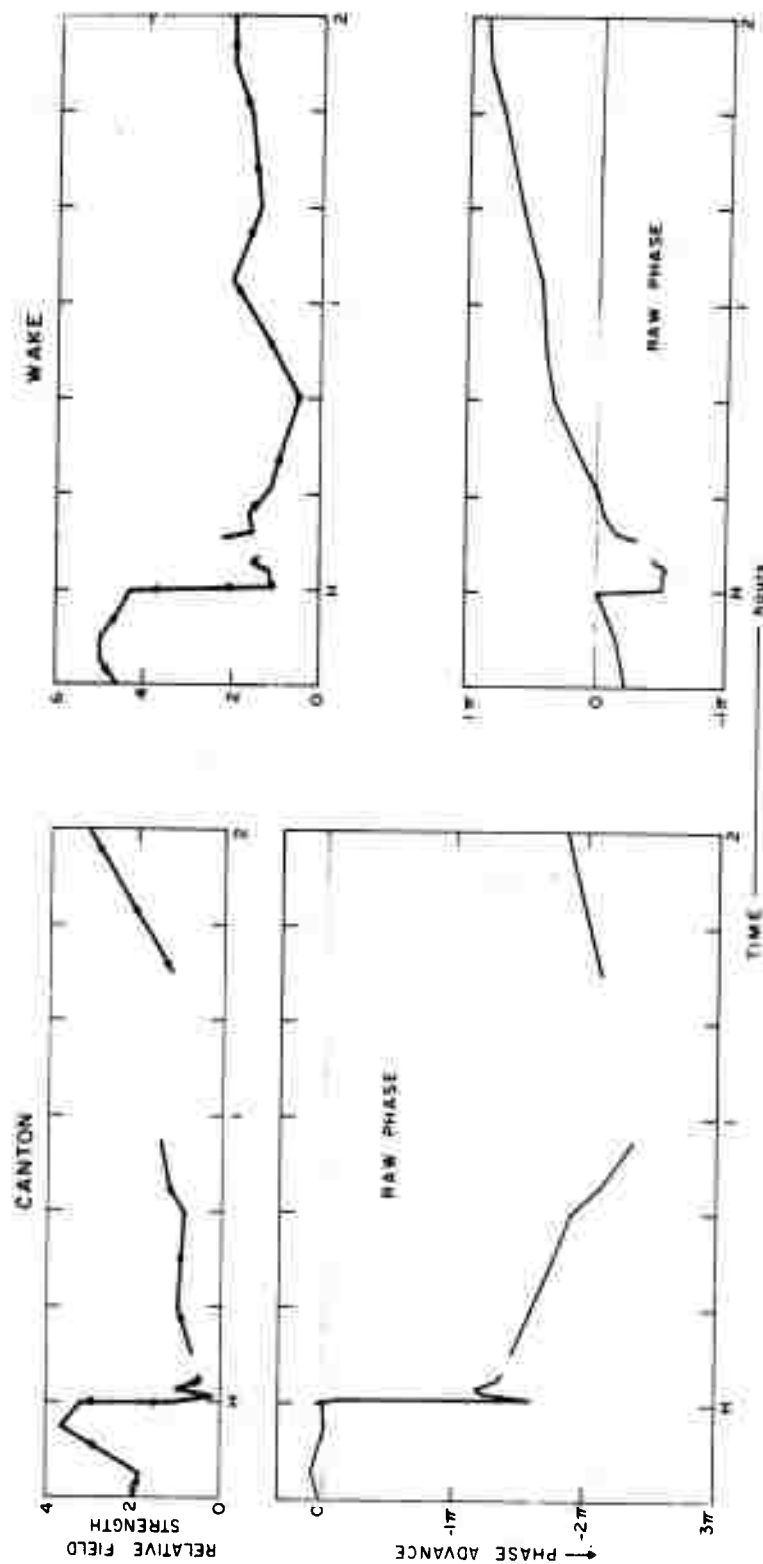


Figure 2.6 Amplitude and phase detail at Canton and Wake, Star Fish.

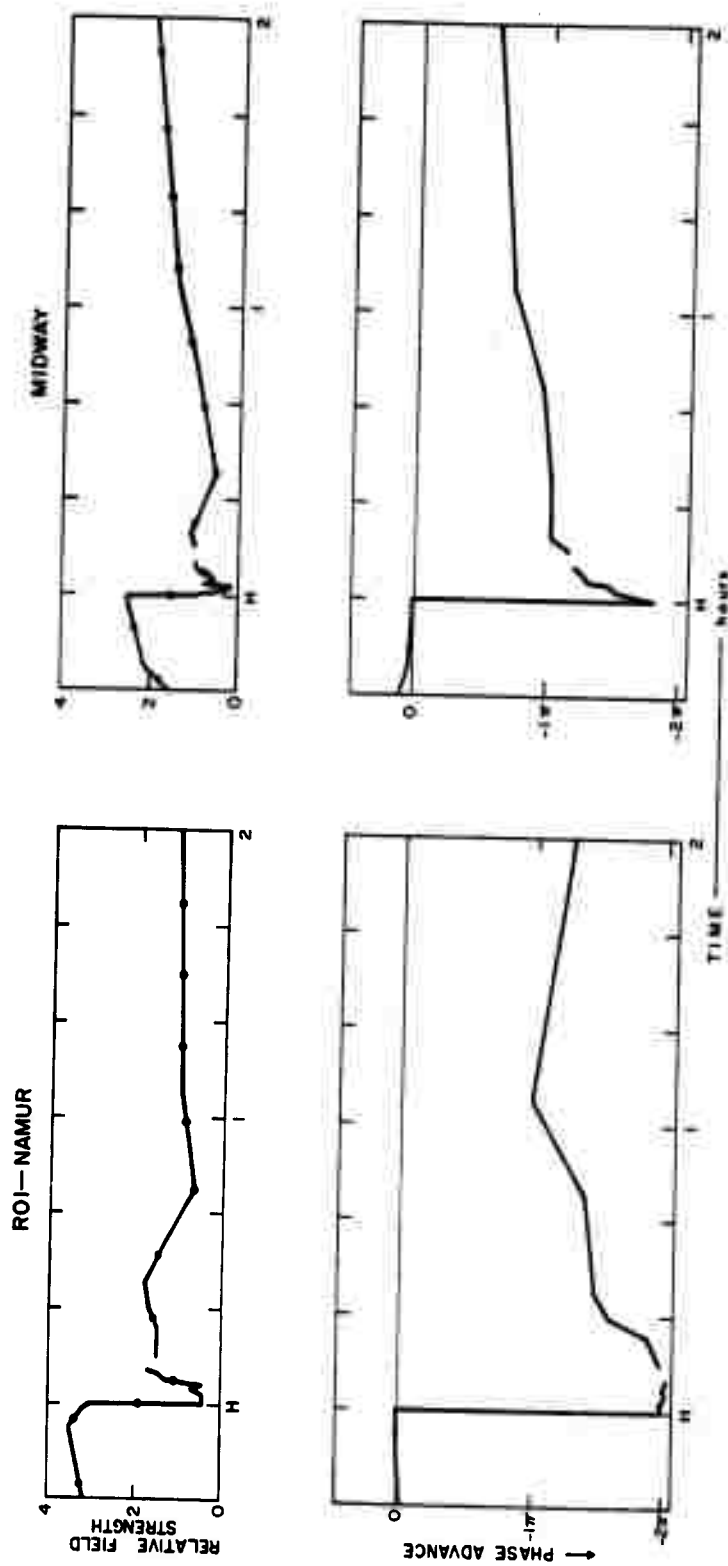


Figure 2.7 Amplitude and phase detail at Roi-Namur and Midway, Star Fish.

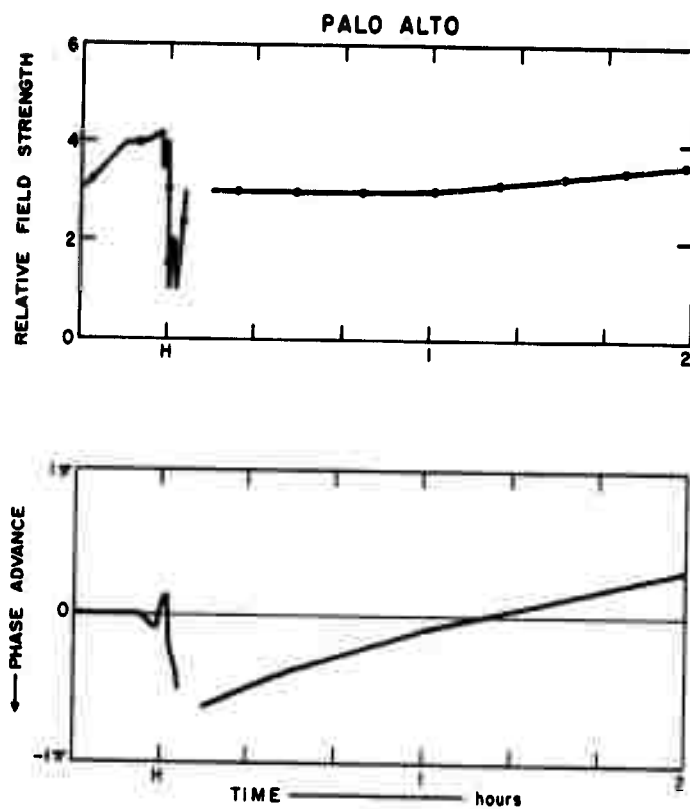


Figure 2.8 Amplitude and phase detail at Palo Alto, Star Fish.

CHAPTER 3

CHECK MATE

3.1 GENERAL

The Check Mate event occurred at 0830 GMT, on 20 October 1962. Records were obtained from all twelve sites; eleven showed effects of the event, Fairbanks being the exception. Figures 3.1 through 3.4 show diurnal amplitude and phase data for the event-related period. Figures 3.5 through 3.10 show details of amplitude and phase variation near event time. (All figures for the Check Mate event are at the end of this chapter.)

The hourly off-periods for the NBA transmitter are not shown on the curves, because the first one after the event was at $H + 37$ minutes, when variation in the data was less pronounced than in the first 20 minutes following the event. Ground sunrise at NBA was about 1108 GMT.

3.2 OKINAWA

The diurnal phase and amplitude variations of the received NBA signal at Okinawa are shown in Figure 3.1 (top) for five days associated with the event period. Four consecutive days are shown, beginning with the day before the event. Midpath midnight was taken at 1100 GMT, but it is evident from the spread in the phase curves that ionospheric conditions were not undisturbed in the hours near this selected midnight. This is to be expected on such a long northern path.

The amplitude data show good agreement at all hours of the day. An appreciable attenuation is apparent in the event curve at event time. Recovery to normal signal level is early, near $H + 30$ minutes; and the curve follows the recorded diurnal variation throughout the rest of the day. A phase advance of 1.8π occurred at event time. A two-day average was used to obtain the drift-slope on event day and the day before event. The event-day curve shows a large deviation from normal until about $H + 6$ hours and returns to normal by $H + 7$ hours.

Details of phase deviation and amplitude at Okinawa are shown in Figure 3.6. Amplitude, compared to the average level before H , falls immediately to less than 0.1, then rises abruptly to 0.35 at $H + 0.5$ minute. There is no appreciable change from there to $H + 3$ minutes; then, the level decreases again at $H + 5$ minutes to 0.1, recovering from that point to 0.7--which is about normal--at $H + 10$ minutes. This normal level is essentially maintained through $H + 2$ hours.

The phase-deviation curve shows an advance of 1.8π at H , very rapid partial recovery to 1.4π at $H + 2$ minutes, and another more gradual advance to 1.7π by $H + 10$ minutes. There is slight scattering of the points during the period of low signal. A gradual recovery follows, to 1.2π by $H + 33$ minutes. A comparison of the Okinawa phase data, presented in Figures 3.1 and 3.6, shows the effect of removing normal phase behavior from the data to obtain the effects due to the event.

3.3 MIDWAY

The diurnal phase and amplitude variations of the NBA signal received at Midway are shown in Figure 3.1 (bottom) for three consecutive days about the Check Mate event. Midpath midnight is at 0800 GMT. The diurnal amplitude curves show excellent correspondence, although signal level is relatively low. A slight diurnal-variation pattern is evident. There is definite attenuation at the event, but the effect is not great and of short duration, less than 15 minutes.

The phase curves show some spread, but agreement from day to day is still good. The low signal level causes some scattering in the phase readings. A very rapid phase recovery is notable in the event-day curve, which approaches normal near $H + 2$ hours, and probably returns to diurnal variation before $H + 5$ hours, since behavior near $H + 4$ hours is in doubt. There is a possibility that phase deviation between H and $H + 2.5$ hours is more drastic (by one full cycle) than that shown, since the variation near $H + 4$ hours is in doubt. Evidence does not seem to indicate that a phase shift of more than one cycle occurred, however.

Figure 3.5 shows details of phase deviation and amplitude at Midway for the Check Mate event. There is a small immediate decrease in signal level at H to 0.7 of its pre-event value, followed by a gradual increase to the former level by $H + 20$ minutes, and to about

1.5 times the former level by $H + 2$ hours. The level is essentially normal after $H + 15$ minutes.

The phase-deviation curve shows an advance at H of about 1.1π and almost immediate partial recovery to 0.6π at $H + 2$ minutes. Thereafter, phase recovery is more gradual, reaching 0.4π at $H + 10$ minutes. The deviation then remains about constant through $H + 1.5$ hours except for a slight retardation at $H + 28$ minutes to 0.3π , and advance to 0.45π at $H + 35$ minutes. By $H + 2$ hours a gradual advance has begun, which continues to $H + 2.5$ hours, when data were lost. Phase has become normal by $H + 4.5$ hours.

3.4 KAUAI

The diurnal phase and amplitude variation of the NBA signal received at Kauai are shown in Figure 3.2 for three consecutive days about the Check Mate event. Midpath midnight is taken at 0900 GMT. There is excellent agreement among the readings in both sets of curves for most hours of the day, but amplitude is in some disagreement near midnight. The amplitude data show a clear diurnal effect. No event effect is readily apparent, as the spread in readings makes comparison doubtful.

A two-day average was used to estimate the drift-slope for 19-20 October and 20-21 October ($0.1\pi/\text{hour}$), since there was scatter in the readings taken for 2 hours prior to the event. The curve drawn before H is an average of the readings taken. This method causes the event curve to shift slightly upward from normal prior to H , but the

effect is compensated for in the phase-deviation plot (Figure 3.6).

The agreement among the phase curves is surprisingly good after 1500 GMT. After the initial advance and recovery within 40 minutes after H, the event produced no pronounced effect.

Details of phase deviation and amplitude at event time are shown in Figure 3.6. Recording levels were low between H - 5 and H + 5 minutes. The amplitude curve shows an increasing trend through the scatter of readings until H, then a decreasing trend, (to the H - 10-minute level) by H + 5 minutes. Signal level is about constant between H + 5 and H + 20 minutes, then increases to 1.5 times the H - 10-minute level. The phase-deviation curve is an average of scattered points ($\pm 0.1\pi$) between H - 6 and H + 3 minutes. It shows an advance of about 0.6π at H, rapid recovery to about 0.3π by H + 3 minutes, and no change from there to H + 5 minutes. Phase then recovers gradually to normal. Diurnal effect becomes apparent after H + 1.5 hours.

3.5 TUTUILA

The diurnal phase and amplitude variation of the NBA signal received at Tutuila are shown in Figure 3.2 (bottom) for the Check Mate event, for event day and the day after. Midpath midnight is at 1000 GMT. Recording level is low on these records, except in the hours near noon. The diurnal amplitude data show some agreement, and diurnal effects are readily apparent, but it is impossible to evaluate well the behavior of the event curve between H - 30 minutes

and $H + 1.5$ hours. The average level through this period is low before and after H , rises near $H + 30$ minutes, falls to about the previous low-level near $H + 1$ hour, and rises to about the level of the following day near $H + 1.5$ hours.

There is better agreement between the two diurnal phase curves. The 21-22 October curve is fairly representative of the diurnal characteristic for the weekly period near the event; the event data follow it closely after $H + 1$ hour. Slight phase advance is shown at H , but the most significant effect is a retardation near $H + 30$ minutes.

Details of phase deviation and amplitude are shown in Figure 3.9. The amplitude curve shows considerable scatter in the readings, attributable to low-level recordings. There is possible evidence of attenuation after H . However, on the average, signal level remains at approximately the pre-event level for the period shown.

The phase-deviation curve shows an apparent advance of 0.1π between H and $H + 1$ minute, but it could well be a result of scatter in the readings.

A significant, gradual retardation shows between $H + 2$ and $H + 20$ minutes, to a maximum deviation of 0.5π . Slow recovery takes place from that point until $H + 65$ minutes when phase is essentially normal. The rates of change of slope and drift rates for these data make it impossible to assume a 2π phase advance at H that the system would not have followed.

3.6 CANTON

The diurnal amplitude and phase of the NBA signal received at Canton for three days around the time of the Check Mate event are shown in Figure 3.3. Midpath midnight is 0800 GMT. The diurnal amplitude curves show a pronounced diurnal effect after local (midpath) noon, and there is reasonable conformity among the three curves. A slight attenuation shows after H in the event curve; another larger attenuation shows near H + 30 minutes; and signal appears low until H + 5 hours. However, there is no marked effect as is seen in data for other events.

The diurnal phase curves show closely grouped readings throughout much of the day, in spite of sparse data. A one-cycle advance was inserted at the event to bring the drift-slope for event day into correspondence with those of the background days. Scatter is evident in the readings for the first hour after H, but the curve evidently shows abnormal phase advance until H + 8 hours. The diurnal effect is evident in the data after H + 4 hours.

Details of phase deviation and amplitude are shown in Figure 3.5 for a period of 2.5 hours about the Check Mate event. Signal levels are low on the record for this period, and time resolution is poor. The amplitude detail shows no definite pattern through the event; it indicates only a gradual general attenuation to about 0.5 of the pre-event level, which lasts until H + 1.5 hours, when the signal level begins to increase toward normal. The accuracy of the readings is poor until about H + 1 hour.

The phase-deviation curve shows a rapid advance of about 1.8π between H and H + 2.5 minutes. There is a $\pm 0.2\pi$ scatter in the readings, due to the small signal level. An average through the curve shown should be assumed for the phase variation. There is indication of a fairly rapid partial recovery after H + 3 minutes, to about 1.0π by H + 40 minutes. The data are more accurate by H + 40 minutes and show a further phase advance, more gradual now, to 1.4π by H + 2 hours. Near H + 3 hours, there is an apparent partial recovery, which seems to show diurnal effect. The normal conditions are reached by H + 8 hours.

3.7 VITI LEVU

The diurnal phase and amplitude variations for the NBA signal received at Viti Levu are shown in Figure 3.4. Five consecutive days about the Check Mate event are represented. Midpath midnight is 1000 GMT. There is poor agreement among the amplitude curves, although a diurnal variation is clearly evident. There is a large attenuation in the signal level at H, followed by early recovery. Comparison with an average normal amplitude curve for this period would probably be meaningless.

The diurnal phase curves show excellent agreement. The drift-slope variation through the period has been established without doubt, and the slope is not extreme (4.8 cycles per day). Since there is no evidence for assuming a one-cycle phase advance at H, the event curve has been drawn to show phase retarded by the event, an anomalous effect. Recovery to normal occurs within 2.5 hours after H.

Details of phase deviation and amplitude at Viti Levu are shown in Figure 3.9. Amplitude falls abruptly to about 0.8 of the pre-event level at event time. Average signal level seems to have recovered fully by H + 20 minutes.

The phase-deviation curve shows a retardation of 0.4π immediately at H, rapid recovery to 0.2π at H + 2 minutes, and then further retardation to about 0.9π at H + 20 minutes. (Scatter of $\pm 0.05\pi$ is evident in the readings until H + 10 minutes.) Final recovery begins by H + 35 minutes and continues gradually through H + 90 minutes, when phase is essentially following the normal diurnal pattern.

3.8 SOUTH POINT

There were only 15 hours of usable data available from South Point in a five-day period about the Check Mate event. These were consecutive, beginning at H - 30 minutes on event day. As a result, phase data are shown in the raw form, with corresponding amplitude, in Figure 3.7. These are the only curves of South Point data shown for the event.

The amplitude-detail curve of Figure 3.7 shows an enhancement at H, to about 2.0 times the pre-event level. In terms of the average pre-event level, signal varies from 2.0 at H + 0, decreasing to 1.6 by H + 5 minutes. The level is approximately constant from H + 5 to H + 70 minutes, except for a drop to 0.8 at H + 30 minutes, when the record shows extremely erratic signal which is averaged on the plot in Figure 3.7. There is a decrease to pre-event level at H + 1.5 hours, followed by a gradual return to 1.6 by H + 2 hours.

The raw phase data include oscillator drift that is probably less than -0.4π radian per hour, so it is reasonable to assume that the variation after $H + 1$ hour represents phase recovery. A phase advance of 0.7π has been assumed to occur at H (in lieu of a retardation, and in keeping with the effect shown at Kauai). There is rapid partial recovery in phase through 0.5π at $H + 1$ minute. Little change is apparent from $H + 7$ to $H + 25$ minutes, with slight retardation near $H + 30$ minutes, and an advance from $H + 30$ to $H + 40$ minutes. By $H + 50$ minutes, there appears to be a very slow recovery, which continues through $H + 130$ minutes.

3.9 WAKE

The data available for Wake for the Check Mate event are limited to 3 hours on event day. Only the details of amplitude and raw phase are shown (Figure 3.7), because it was impossible to determine a drift-slope for event day. The phase data show an assumed advance between H and $H + 1$ minute of about 0.9π , and a further less-rapid advance to 1.4π by $H + 8$ minutes. Phase remains approximately constant from there to $H + 50$ minutes, except for a slight retardation at $H + 10$ minutes. There is apparent recovery after $H + 1$ hour, continuing until data are lost at $H + 2.5$ hours.

The amplitude-detail curve shows a large attenuation at the event. With respect to the pre-event level, the variation is: a very rapid decrease to 0.15 at $H + 0.5$ minute, a rapid recovery to 0.7 at $H + 10$ minutes, another decrease to 0.5 by $H + 16$ minutes,

and a gradual general recovery throughout the rest of the period shown.

3.10 RAROTONGA

Only 22 hours of NBA data were available from Rarotonga around the Check Mate event time, so no diurnal comparison was possible. The event occurred in the middle of the recording period. A drift-slope of $+0.6\pi$ radian per hour was estimated from the appearance of the phase data, and phase was normalized to this slope. The normalized phase-detail curve, with corresponding amplitude, is shown in Figure 3.8. The normalized phase curve shows a rapid retardation beginning at H and continuing through 0.4π at H + 5 minutes, then very gradual retardation to a maximum of 0.5π at H + 33 minutes. There is a very gradual advance from that point through H + 2 hours. It is possible that a phase advance of one cycle occurred at H, but since no evidence was available to indicate such behavior, the retardation effect is shown.

The amplitude curve in Figure 3.8 shows a slight change through the event and an abrupt increase at H + 0.5 minute, followed by a rapid decrease at H + 1 minute to 0.7 of the pre-event level. Recovery is complete by H + 4 minutes.

3.11 PALO ALTO

The effect of the Check Mate event on the NBA signal received at Palo Alto was slight, no appreciable deviation in amplitude or

phase being apparent, except within a few minutes of the event. Only detailed-amplitude and normalized-phase curves are shown (Figure 3.8). Diurnal amplitude and phase show no event effect beyond the immediate event period. The amplitude-detail curve shows significant attenuation between H and $H + 1$ minute, to about 0.16 of the pre-event level. There is a very rapid recovery to the pre-event level at $H + 2$ minutes, and a very gradual increase from there throughout the rest of the period shown. The level is essentially normal for the entire day, except for the interval from H to $H + 2$ minutes.

The normalized phase curve shows a slight advance at event time of 0.2π , in conjunction with the attenuation in signal level (there is a scatter in the readings prior to H almost this large, $\pm 0.05\pi$, and the curve drawn is an average of these data until $H - 0$). The change in phase at event time might be the result of scattered readings, but the scatter in data is very small after H . There is no appreciable deviation from normal in the entire period shown.

3.12 ROI-NAMUR

Fewer than 5 hours of NBA data are available from Roi-Namur for the day of the Check Mate event, but they are consecutive around the event. The variations in these data are shown in detail in Figure 3.10. Phase is plotted in the raw form. It is not possible

to estimate the oscillator drift-slope. The raw-phase curve shows a suspicious step-like variation (no equipment malfunction is noted, and the record seems normal): the phase angle is seen at 0 before H, advances to π at H, remains constant to H + 4 minutes, and then is lost. When the signal returns at H + 21 minutes, the phase angle is 2π , and it does not vary appreciably for over an hour. The phase data after H + 21 minutes could be plotted starting at zero, since there is no way to determine its relative position with the few data available. Similarly, a phase retardation could be shown following the event. A gradual phase advance finally occurs after H + 1.5 hours.

The detailed amplitude curve shows reasonable variation. At H, there is an immediate attenuation to 0.5 of the pre-event level and a further decrease to 0.14 at H + 4 minutes. Signal is lost at H + 5 minutes; it reappears at H + 21 minutes at 0.14. The amplitude then increases to 0.5 by H + 35 minutes and remains constant at that level until H + 70 minutes. By H + 1.5 hours, the signal amplitude has returned to 0.8.

3.13 SUMMARY

For the Check Mate event, data were collected at event time at twelve sites. All sites except Fairbanks observed event-associated effects. A review of the Fairbanks data shows a possible small disturbance at 0830 GMT, but its validity is in question since the record contains many similar disturbances at other times.

The recorded amplitude of the received NBA signal during the Check Mate event gave no clear indication of a pattern in the observed effect. All stations show a disturbance at event time, but this disturbance is small and results in short-term variations both as attenuations and enhancements of signal level.

Phase variations for Check Mate show phase advances for paths into the northern or event area, with a return to normal in 1 or 2 hours. Canton, Palo Alto, and Okinawa show phase advances that persist for several hours, with Palo Alto showing the smallest event-associated effect and Okinawa showing the largest. The three southern or conjugate-area stations show an unexpected phase retardation, reaching a maximum at $H + 20$ minutes and returning to normal within 2 hours. Evidence of the phase retardation has persisted through all attempts in data analysis to force the data to show a phase advance. In addition, a comparison of the maximum retardation at Tutuila and Viti Levu is consistent with propagation path lengths.

The Check Mate event occurred at 0830 GMT. Ground sunrise at NBA occurred at 1108 GMT, giving over 1.5 hours before any part of any path was in daylight. In general, event disturbances were recovered before sunrise ($H + 1.5$ hours), except for Canton and Okinawa which returned to normal at about 8 hours.

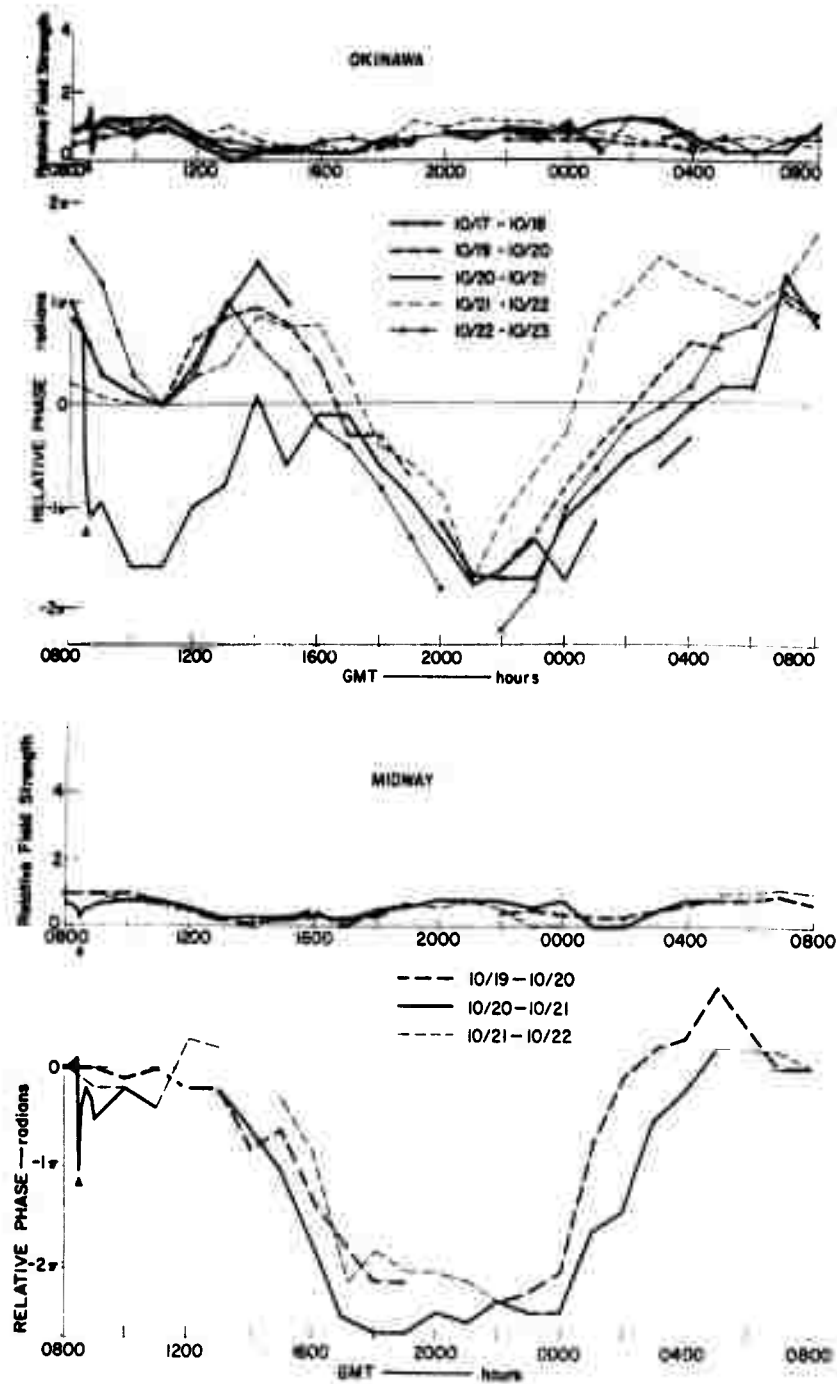


Figure 3.1 Diurnal amplitude and phase at Okinawa and Midway, Check Mate.

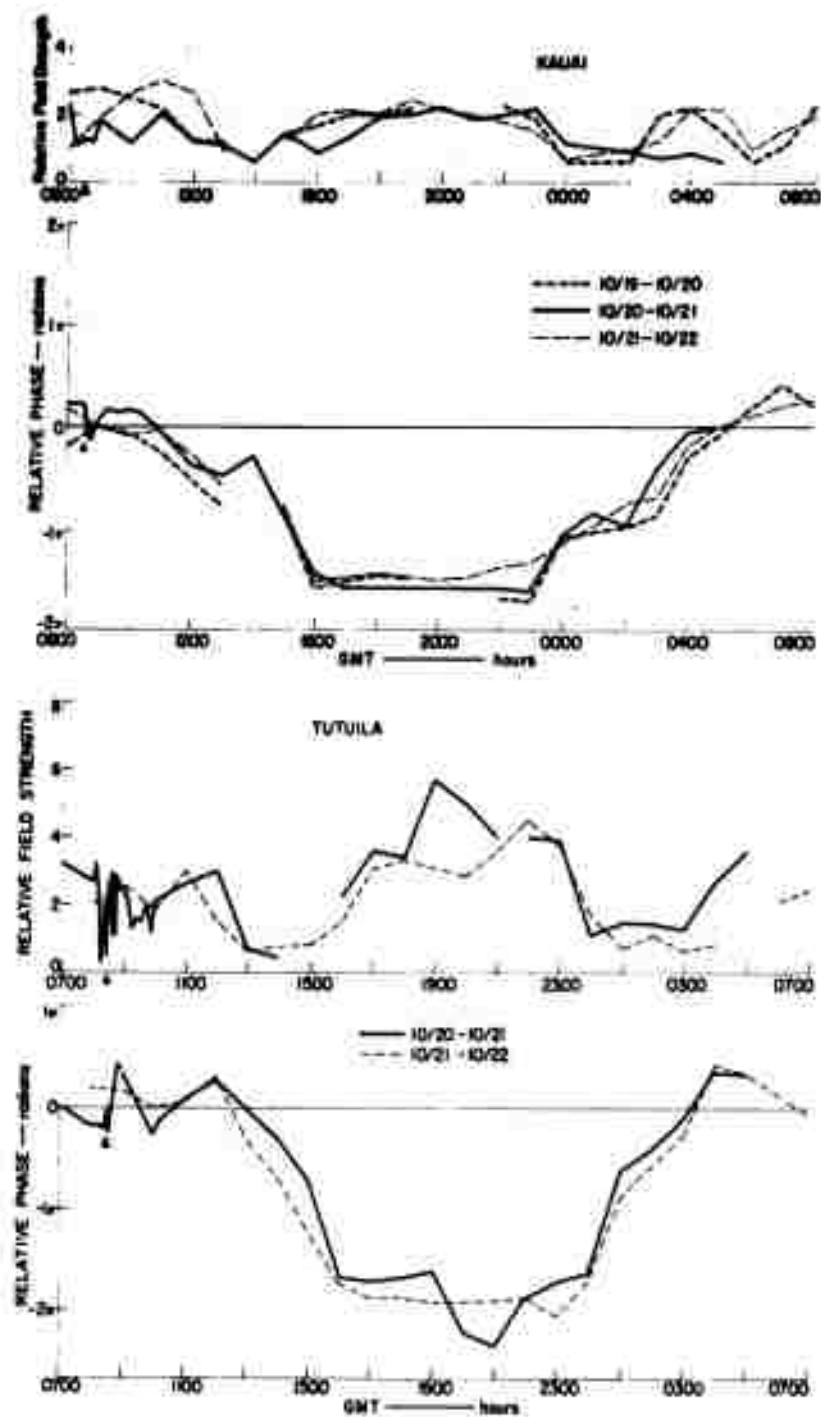


Figure 3.2 Diurnal amplitude and phase at Kauai and Tutuila, Check Mate.

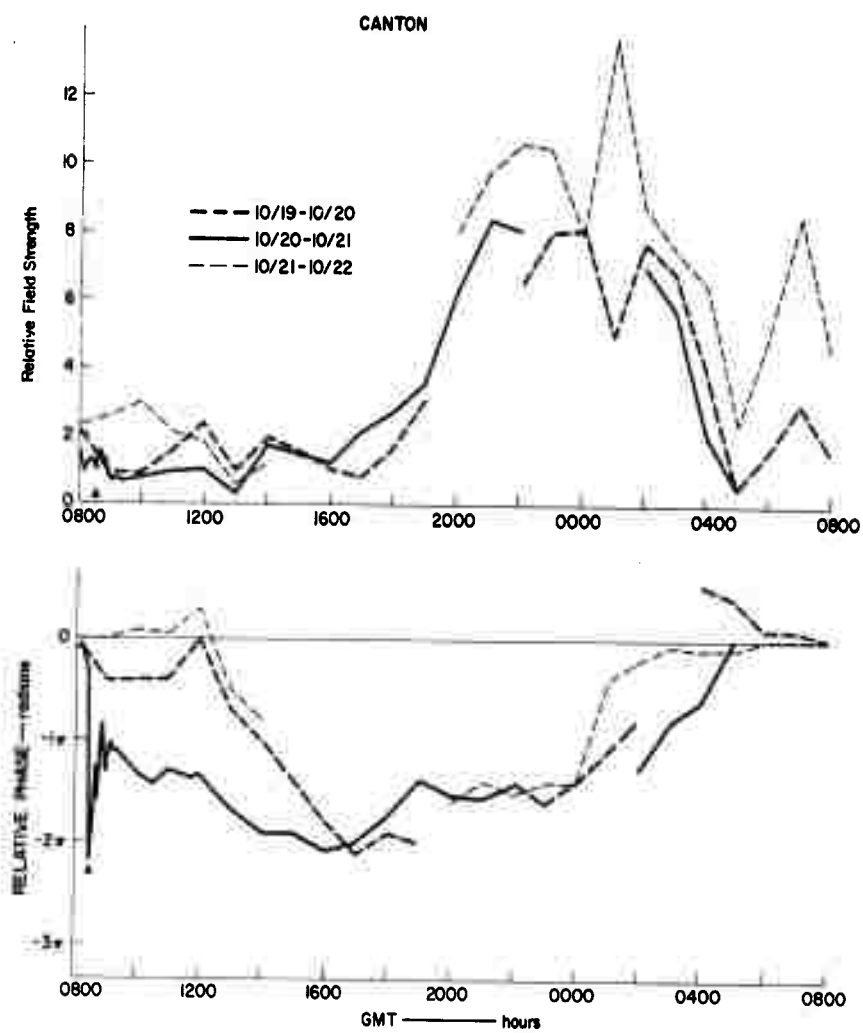


Figure 3.3 Diurnal amplitude and phase at Canton, Check Mate.

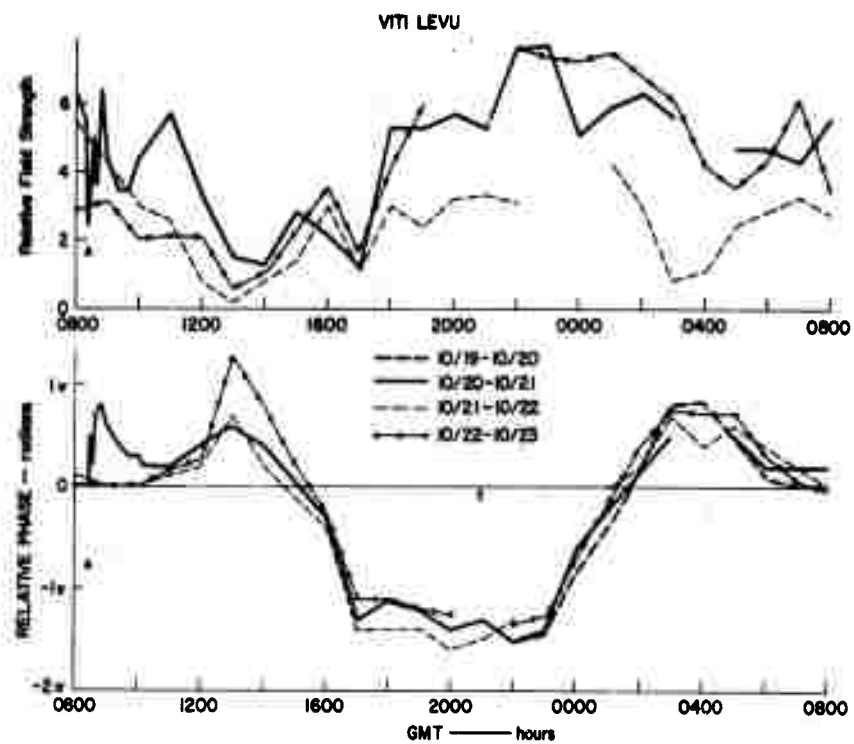


Figure 3.4 Diurnal amplitude and phase at Viti Levu, Check Mate.

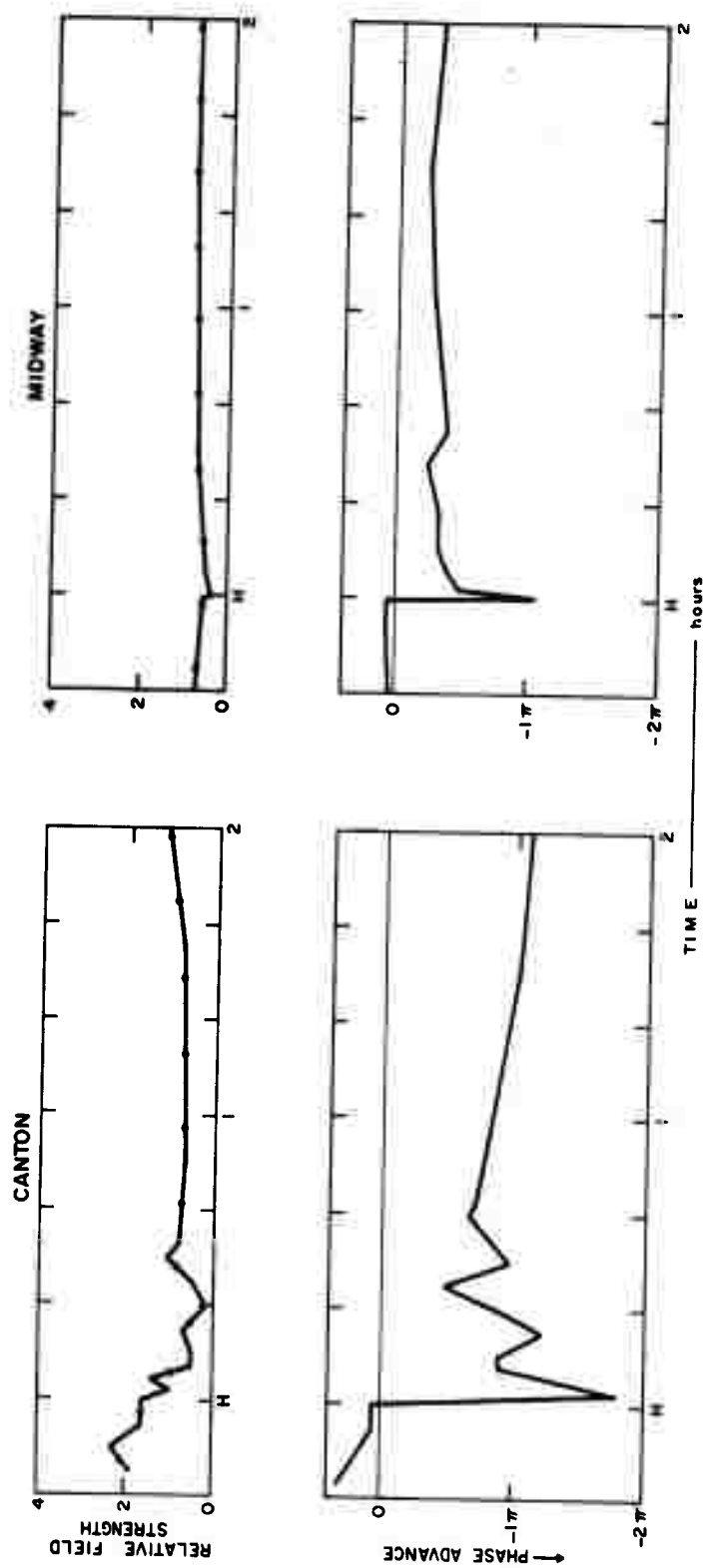


Figure 3.5 Amplitude and phase detail at Canton and Midway, Check Mate.

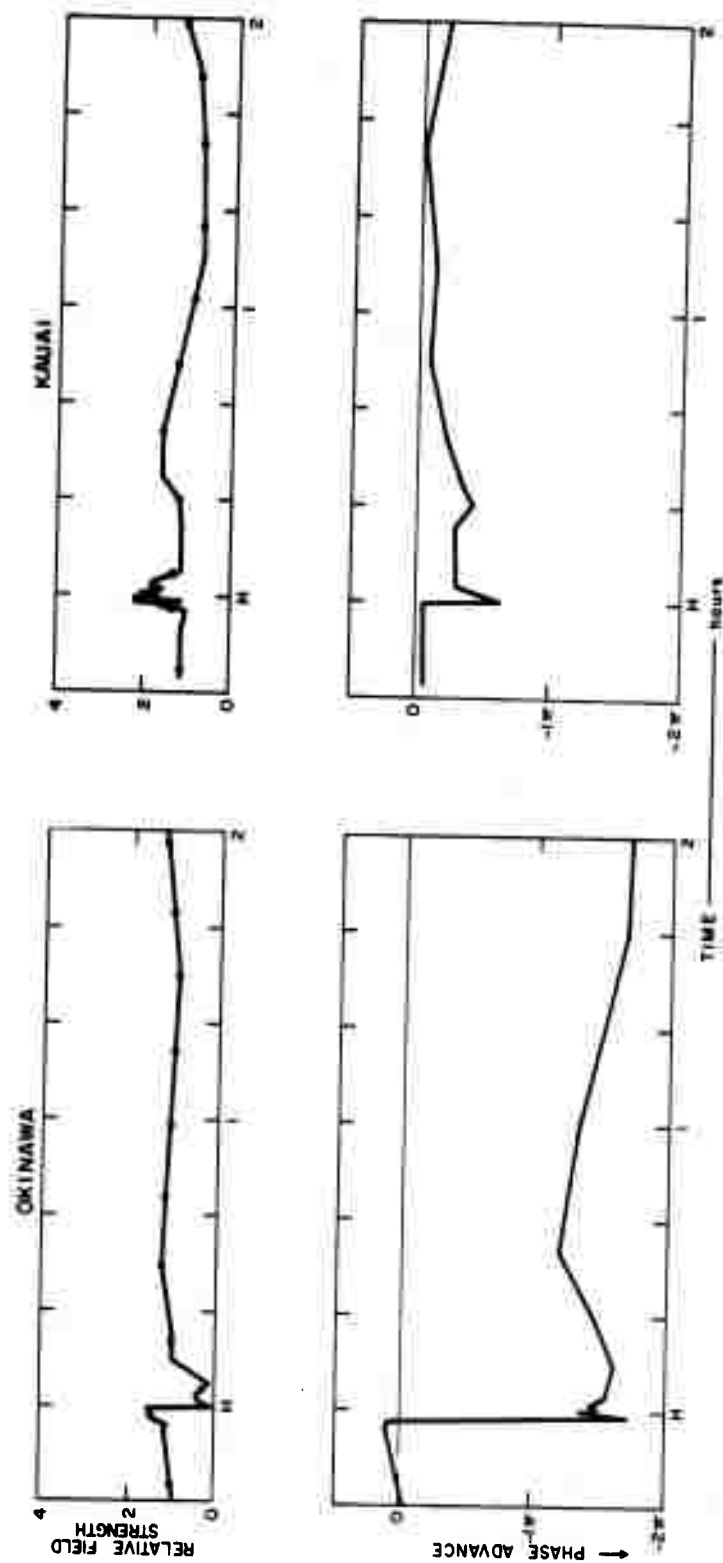


Figure 3.6 Amplitude and phase detail at Okinawa and Kauai, Check Mate.

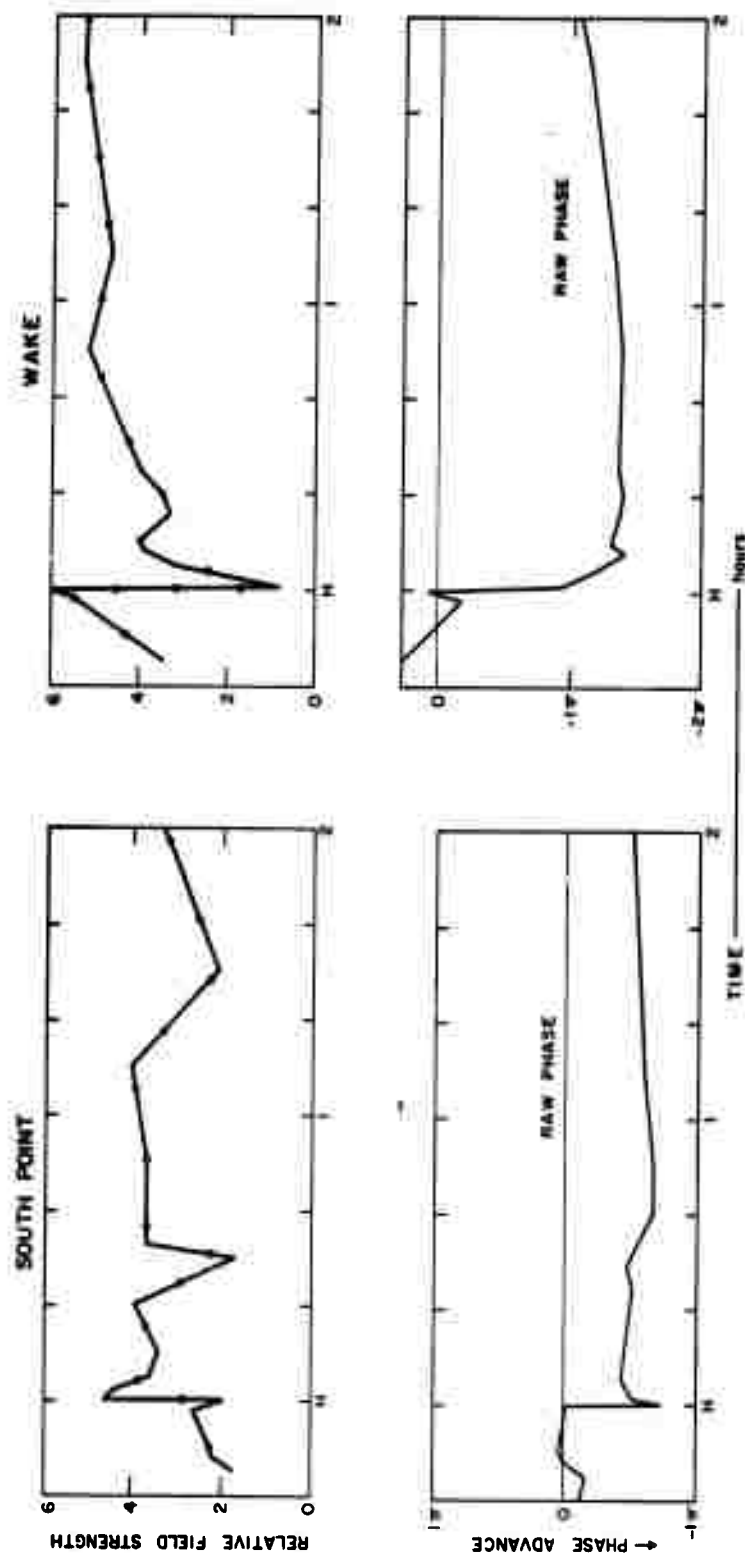


Figure 3.7 Amplitude and phase detail at South Point and Wake, Check Mate.

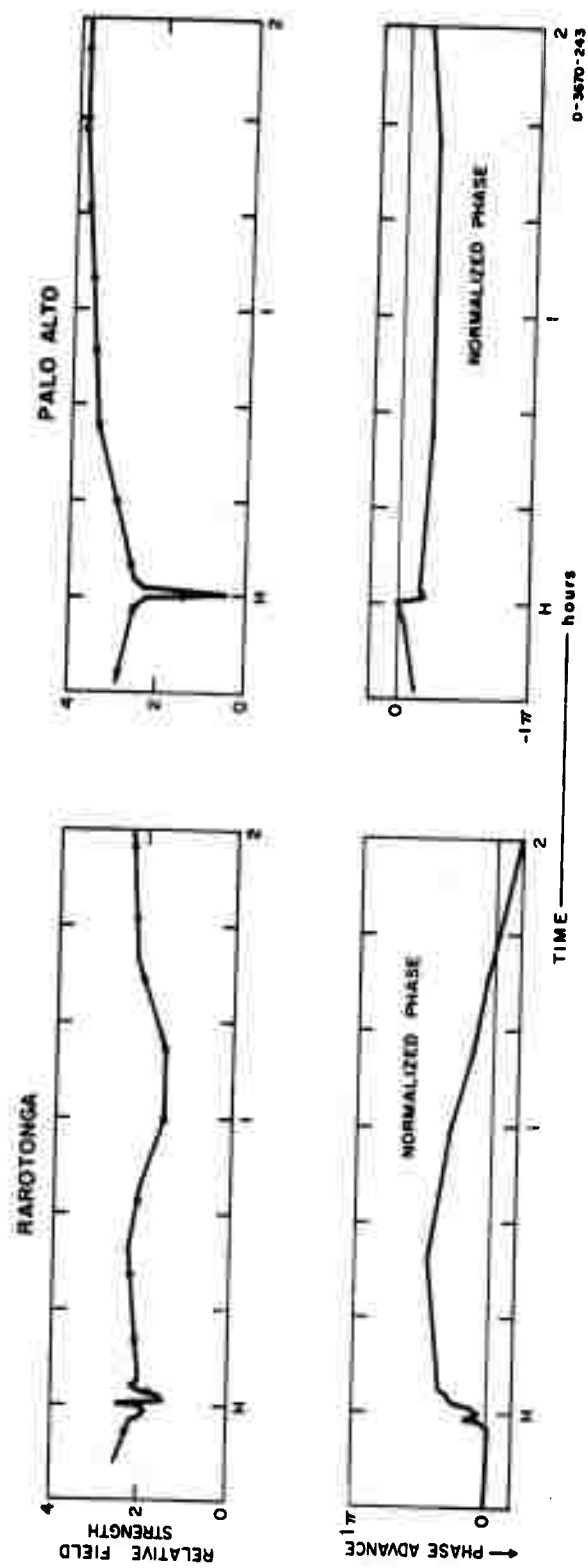


Figure 3.8 Amplitude and phase detail at Rarotonga and Palo Alto, Check Mate.

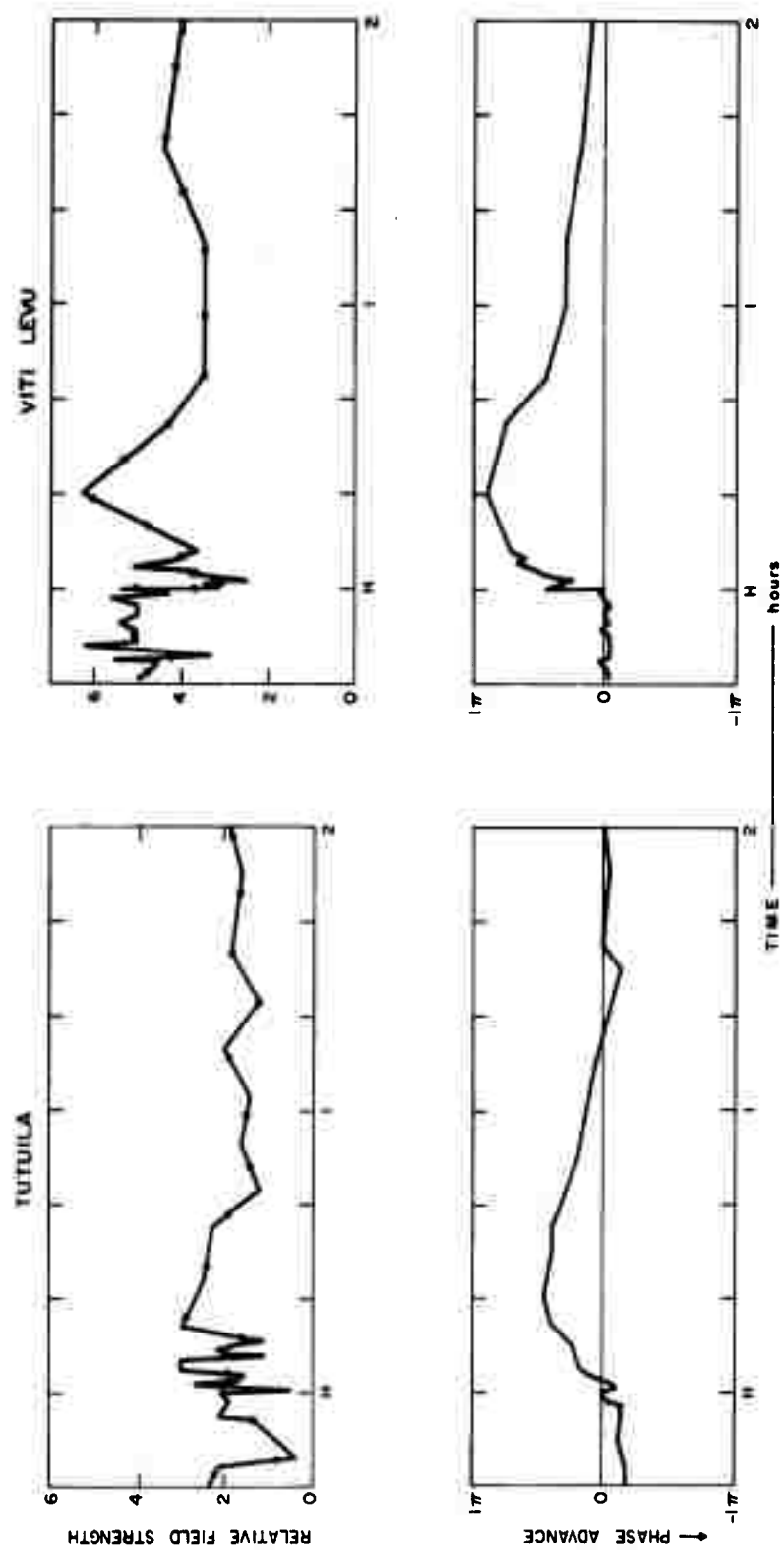


Figure 3.9 Amplitude and phase detail at Tutuila and Viti Levu, Check Mate.

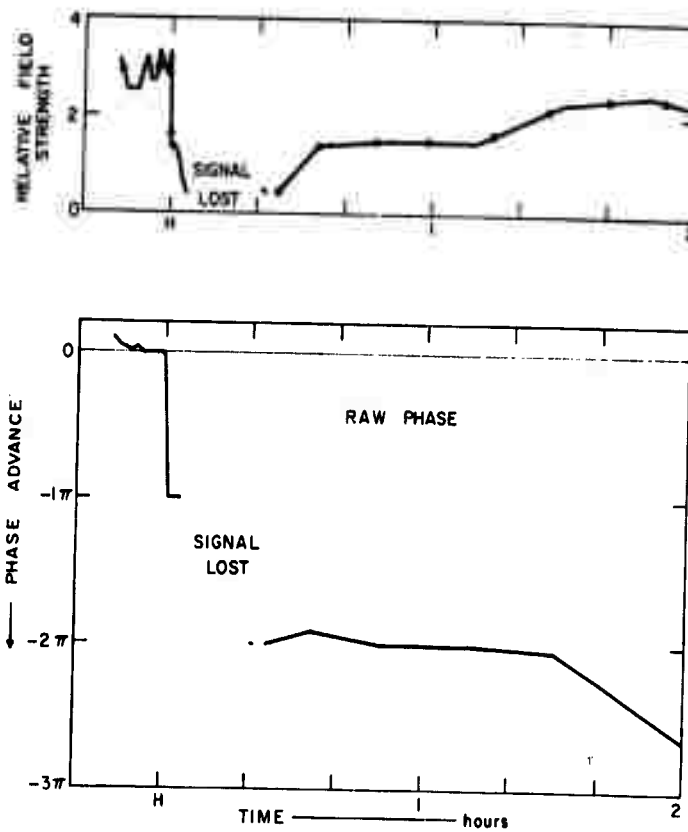


Figure 3.10 Amplitude and phase detail at Roi-Namur, Check Mate.

CHAPTER 4

BLUE GILL

4.1 GENERAL

For the Blue Gill event on 26 October 1962, data showing effects of the event were obtained at nine sites; Canton showed no effect, and Fairbanks and Rarotonga records were unreadable at event time.

Figures 4.1 through 4.4 show the diurnal phase and amplitude data for event day and selected background days. Figures 4.5 through 4.9 show phase and amplitude details from 20 minutes before until 2 hours after the event. (All figures are given at the end of this chapter.)

The Blue Gill event occurred at 0959:48 GMT. Ground sunrise at NBA occurred at 1108 GMT. From 1004 to 1007, NBA transmitted a key-down (CW) signal; it was off from 1007 to 1010. For the remaining 54 minutes of each hour, the duty cycle was 0.3.

4.2 OKINAWA

The diurnal amplitude and phase variations of the received NBA signal at Okinawa for three consecutive days ending with that of the Blue Gill event, plus the second day after the event, are shown in Figure 4.1. The first day afterward is not shown, because adjustment to the oscillator disrupted phase data. Midpath midnight is at 1100. The amplitude curves, though relatively low, show a fairly

uniform pattern without gross diurnal effect. The event effect is seen as a definite attenuation, followed by an early return to normal level.

The phase curves of these days are very similar. Unfortunately, no data were available for the period $H + 2$ to $H + 6$ hours, so the phase advance at H had to be assumed (this was done in preference to showing a retardation of 0.6π at H) to bring the effect into some conformity with that observed on the Palo Alto path (shown in Figure 4.2). As can be seen in Figure 4.1, the H to $H + 2$ -hour data could be reasonably plotted up 2π radians. After the marked advance at H , the event curve shows indications of returning toward normal by $H + 2$ hours. The phase compares well with the background after $H + 6$ hours.

Phase deviation and amplitude at event time are shown in detail in Figure 4.5 for the Okinawa path. Signal amplitude was fading just before the event, and had reached 0.5 times its previous static level by $H - 0$. (Amplitudes are referenced to the average level between $H - 20$ minutes and $H - 1$ minute.) A further attenuation occurred at H , to about 0.1 of the average level. Signal level then gradually increased to its former value by the end of the off-period, at $H + 10$ minutes.

On the phase-deviation detail curve, an initial advance of 1.8π has been shown from H to $H + 3$ minutes, then a slight recovery to about 1.6π by $H + 10$ minutes. Phase deviation changes little between $H + 10$ and $H + 60$ minutes; it gradually advances to about 2π at

H + 80 minutes, and recovers toward the average characteristic curve between H + 90 and H + 100 minutes. Recovery is checked after H + 100 minutes, probably by the sunrise effect.

4.3 PALO ALTO

The diurnal amplitude and phase variations in the received NBA signal at Palo Alto are shown in Figure 4.2 (top) for four consecutive days, beginning with the day before the Blue Gill event. Midpath midnight was taken at 0800 GMT. No diurnal variation is apparent in the amplitude curves. The event-day data match those for the other days, after H + 1 hour. There is attenuation at H, recovery to normal, a second attenuation, and final recovery in signal level during the first hour after the event.

The diurnal phase curves show considerable spread in Figure 4.2, probably indicating that conditions were unstable at midnight for this path (note that the greatest spread in amplitude curves is near midnight). Thus, misalignment is probably the reason for the apparent long-term advanced phase effect in the event-day phase curve. The curve for 28-29 October is near to an average characteristic for the period of a week about the event. The event curve follows this in diurnal effect from about H + 1 to H + 6 hours, after recovering quickly from a sharp phase advance at H.

Details of phase deviation and amplitude at event time are shown in Figure 4.7. The receiver was off for about 1 minute prior to the

event. In reference to the pre-event level, amplitude is attenuated to 0.2 immediately after the event, then rises swiftly to 1.5 by $H + 4$ minutes, where the level remains until $H + 7$. After the signal reappears, it decreases fairly rapidly to less than 0.1 at $H + 15$ minutes. Another quick rise before $H + 20$ minutes brings the level to about 0.6, where it remains until $H + 30$ minutes. By $H + 50$ minutes the signal level is about 1.5; it remains there through $H + 2$ hours.

The phase deviation shows an initial phase advance of 1.9π at H , followed by gradual recovery to 1.3π by $H + 15$ minutes and more rapid recovery to 0.9π by $H + 20$ minutes. There is a pause in recovery between $H + 20$ and $H + 40$ minutes, and the return to normal occurs fairly quickly between $H + 40$ and $H + 60$ minutes.

4.4 WAKE

The diurnal amplitude and phase variations in the received NBA signal at Wake are shown in Figure 4.2 (bottom) for the days before, including, and after the Blue Gill event. Midpath midnight was taken at 1100 GMT. There is reasonable agreement among the phase curves, although amplitude data are widely spread. The assumption of the phase advance at $H + 0$ is seen to so orient the phase curve that it begins to follow the sunrise effect by $H + 2$ hours and continues to vary approximately with the background for the rest of the day, although the hours from 1400 to 2000 GMT, when signal level

is consistently low, are represented by doubtful readings, or none at all. A retardation in phase could have been assumed at event time, in view of the gap in data after $H + 2.5$ hours, but the orientation shown is more consistent with data obtained over similar paths. The amplitude curves show little more than a diurnal trend; signal level is possibly below normal until about 2 hours after the event.

The phase deviation and amplitude detail are shown in Figure 4.7. The phase curve prior to H is drawn as an average of points scattered over about $\pm 0.1\pi$. Individual data points are connected after event time. Following an initial advance of about 1.8π immediately after H , phase recovers rapidly to about 1.2π by $H + 10$ minutes and then advances slightly between $H + 10$ and $H + 40$ minutes. Recovery to normal has apparently begun by $H + 1$ hour and is complete by $H + 2$ hours.

Amplitude is attenuated to less than 0.1 of pre-event (average) level at the time of the event and recovers to 0.75 almost immediately. The amplitude then falls off again, reaching a relative level of about 0.2 at $H + 4$ minutes. Another recovery of signal amplitude follows, resulting in an increase to 1.2 at $H + 20$. The level then returns to about 0.5 between $H + 40$ and $H + 100$ minutes. Another increase has begun by $H + 2$ hours, but it is probable that diurnal effect predominates by this time.

4.5 KAUAI

Figure 4.3 (top) shows the diurnal amplitude and phase characteristics of the received NBA signal at Kauai from two days before to one after the event. Midpath midnight is at 0900 GMT. The background signal-amplitude level shows a relatively narrow spread between curves; there are indications that the signal level for event day is consistently low. Absence of marked diurnal variation in all the amplitude curves is notable, as is the enhancement which follows the event. Amplitude average was below normal before the event, increased to about normal level just after the event, and returned to a relatively low level for most of the day.

Diurnal phase comparison is fairly reasonable for all days except that prior to the event, when an adjustment was made to the oscillator. For this reason, 23-24 October was added to give a better idea of the normal phase characteristic. For this data it was obvious from drift-slope variation that an advance in phase of less than one cycle occurred at H, and the orientation shown--with phase behaving normally by H + 2 hours--is deemed correct, although the spread in phase data is considerable at certain hours of the day.

The phase-deviation and amplitude detail curves are shown in Figure 4.8. Occasional periods of high noise level obscured signal on the record, notably between H - 30 minutes and H - 0; readings in this period should be averaged. An increase in signal level at event

time reaches 1.7 times the pre-event level by $H + 1$ minute. Amplitude remains constant until $H + 15$ minutes and shows slight variations about this same level until $H + 1$ hour. By $H + 2$ hours the amplitude has returned to pre-event level.

The phase deviation prior to event time shown in Figure 4.8 for Kauai represents an average of readings spread over $\pm 0.05\pi$. All data after H are represented by the phase curve. An immediate phase advance of 0.8π at H is followed by a very rapid partial recovery to 0.4π at $H + 1$ minute. Phase is fairly constant to $H + 6$ minutes, followed by another advance to 0.6π by $H + 15$ minutes, and gradual return to normal by about $H + 1.5$ hours.

4.6 SOUTH POINT

The diurnal amplitude and phase variations for the received NBA signal at South Point are shown in Figure 4.3 (bottom) for three consecutive days about the Blue Gill event. There is considerable spread in the amplitude readings for this period, with only a general diurnal trend apparent. The signal on event day reaches an unusually high level between $H + 0.5$ and $H + 1.5$ hours, but seems to follow the general diurnal aspect otherwise. Low signal levels on the event-day record (at frequent intervals) and the loss of data from H to $H + 20$ minutes limit the value of these data.

The diurnal phase curve for the event day shows obvious scatter in the data. Phase was apparently beginning to recover when next

seen after the event, and the diurnal sunrise effect predominates by $H + 2$ hours.

The details of amplitude and phase deviation at South Point are shown in Figure 4.8. In terms of the pre-event level, the amplitude curve shows an enhancement from 1.0 at $H + 19$ minutes, when the equipment was reset, to 2.0 at $H + 25$ minutes. Near-constant signal level was received until $H + 65$ minutes. The remaining data show a decreasing trend toward $H + 2$ hours.

The phase-deviation data show the phase advanced by about 0.4π when next seen after the event ($H + 19$ minutes); the advance continues to about 0.6π at $H + 25$ minutes. Recovery has begun by $H + 30$ minutes and is complete by $H + 1$ hour.

4.7 ROI-NAMUR

The diurnal amplitude and phase of the received NBA signal at Roi-Namur for four days around the Blue Gill event time are shown in Figure 4.4 (top). Midpath midnight was taken at 0900 GMT. Amplitude on event day begins higher than normal average (a continuation of a high level on the day before). Attenuation occurs during the first hour after the event, then a return to a slightly high level. Attenuation through the morning hours has brought it to about normal, but the curve falls below the usual diurnal effect near noon and continues to remain below normal for the rest of the day. The event-day data contain many gaps.

The phase curves do not present a very repeatable pattern for this period, as the oscillator drift was relatively high, tending to obscure diurnal effects. The assumption that a phase advance of less than one cycle occurred at H produces the best fit in the data, considering all aspects. The event-day data show that normal diurnal effects begin to predominate by H + 2.5 hours, although phase seems advanced from normal until about H + 14 hours. Reliability of these data is somewhat impaired by low signal recording level and the high oscillator drift.

Amplitude and phase-deviation details at Roi Namur are shown in Figure 4.6. Consideration of the amplitude data should be based on an average curve through the data points shown. The amplitude data show a sharp attenuation at H to about 0.35 of the pre-event level, and a gradual increase to 0.9 at H + 30 minutes. The signal then decreases to 0.6 at H + 40 minutes and again increases to 1.3 by H + 1 hour, remaining approximately constant to H + 2 hours.

Points on the phase-deviation curve between H - 4 and H + 4 minutes represent an average phase. Scatter is $\pm 0.1\pi$ before and $\pm 0.4\pi$ after H, about the curve shown. From H + 4, where the CW signal was transmitted, the curve is drawn through all data points. Immediate phase advance at H is of the order of 1.4π , with partial recovery to a definite 1.2π at H + 4 minutes. Another advance has occurred during the off period, to 1.8π by H + 10 minutes, and continues to about 2π by H + 20 minutes. Recovery is gradual from

then until about $H + 2.5$ hours, when sunrise effect begins to predominate.

4.8 TUTUILA

The diurnal amplitude and phase variations of the received NBA signal at Tutuila for three consecutive days surrounding the Blue Gill event are shown in Figure 4.4 (bottom). Midpath midnight is at 1000 GMT. The diurnal amplitude curves for the days shown follow a fairly close pattern. An amplitude disturbance is in evidence at event time, followed by data points scattered about a general enhancement of signal for nearly 3 hours.

The diurnal phase variation on event day also follows closely that of the background days after $H + 4$ hours, but shows a considerable deviation in advance of normal from H to $H + 3$ hours. Recovery is rapid between $H + 3$ and $H + 4$ hours. Data on the records were somewhat doubtful from $H + 3$ to 4 hours, but indications of a rapid return were found.

Amplitude-and-phase-deviation details at Tutuila are shown in Figure 4.5. Signal level is dropping before the event. There is very little change at H , followed quickly by a swift increase to 2.0 times the average pre-event level at $H + 1$ minute. Amplitude then continues to rise to 3.0 by $H + 5$ minutes. When signal is regained after the off-period, the level has dropped to about 2 again, but it increases to about 3.4 for the interval between $H + 18$

and $H + 55$ minutes. There is attenuation to 1.5 near $H + 1$ hour, followed by enhancement to 3.5 at $H + 2$ hours. Signal amplitude has returned to normal by $H + 3$ hours.

After an initial sharp advance of 1.7π at event time, phase deviation recovers slightly to 1.5π at $H + 18$ minutes and then advances gradually to 1.8π by $H + 45$ minutes, where final recovery begins. Recovery is gradual until about $H + 3$ hours, then rapid from $H + 3$ to $H + 4$ hours, after which phase appears normal.

4.9 VITI LEVU

All attempts to obtain consistent, repeatable diurnal phase and amplitude curves for the Viti Levu NBA data around the time of the Blue Gill event were unsuccessful. A drift-slope could not be obtained; however, it is certain that the drift-slope is negative and probably less than 0.3π radian per hour. Details of amplitude and raw-phase data from Viti Levu are shown in Fig. 4.6. The amplitude curve shows a sharp attenuation at event time to 0.3 of the pre-event level, followed by a rapid rise to about 1.2 by $H + 10$ minutes. The signal level is then constant until about $H + 1$ hour, when a decrease toward normal by $H + 2.5$ hours begins.

The raw-phase curve shows an advance of 1.8π immediately following the event (this has been assumed in preference to a phase retardation of 0.5π --the data do not indicate which may be correct). This condition is maintained, essentially, throughout the period

shown, and phase does not return toward pre-event condition until about $H + 6$ hours.

4.10 MIDWAY

The phase and amplitude data for the NBA signal received at Midway for the Blue Gill event showed a somewhat reasonable diurnal pattern with considerable spread from day to day at the hours around and following the event. It was impossible to infer a normal background at event time. Therefore, no diurnal data are shown and no phase-deviation comparison is made. The amplitude and normalized-phase details for the Blue Gill event data at Midway are shown in Figure 4.9. Phase data are normalized to an oscillator drift-slope of -0.4π radian per hour. Prior to the event, the phase data points are scattered $\pm 0.2\pi$ around the average curve shown in Figure 4.9.

The phase curve is drawn through all points after the event. The signal level is low throughout the period shown, however, so that a reading error of $\pm 0.2\pi$ should be assumed. At event time, there is phase advance of 0.8π , followed by rapid partial recovery to 0.5π at $H + 1$ minute. It is probable that a gradual phase recovery then starts and is complete by $H + 1$ hour. It is uncertain when phase approaches the normal diurnal characteristic because of the lack of good background phase data for comparison.

Signal amplitude recorded at Midway for this event resulted in extremely low recording levels. The amplitude data shown do indicate

a small attenuation at event time, followed by an enhancement to 1.2 of the pre-event value at H + 5 minutes. The signal had probably returned to pre-event level by H + 15 minutes.

4.11 SUMMARY

The effects of the Blue Gill event on the received NBA signal can be seen in data from nine of the twelve sites. Canton showed no effect, and Fairbanks and Rarotonga did not obtain data at event time. The Blue Gill event occurred at 0959:48 GMT, and ground sunrise at NBA occurred at 1108 GMT, allowing only 1 hour before sunlight had begun to influence all propagation paths.

Signal amplitude, in general, showed an immediate attenuation at event time, followed by an enhancement within H + 5 minutes. At Roi-Namur and Wake, this enhancement did not occur; however, signal amplitude had returned to normal by H + 30 minutes. At Okinawa, the signal enhancement resulted in a return to pre-event signal level by H + 10 minutes. Enhanced signal amplitude was maintained for about 1 hour at Viti Levu, Tutuila, Kauai, and South Point before a return to pre-event levels. At Palo Alto, a second attenuation occurred at H + 15 minutes, resulting in the minimum signal recorded following the event. Recovery was complete in less than 1 hour.

Phase of the NBA signal apparently showed an immediate advance at all stations that recorded an effect. Recovery appears to be complete within 2 hours, when sunrise effects start, except for data at Viti Levu and Tutuila, where the return to normal does not occur until H + 4 hours.

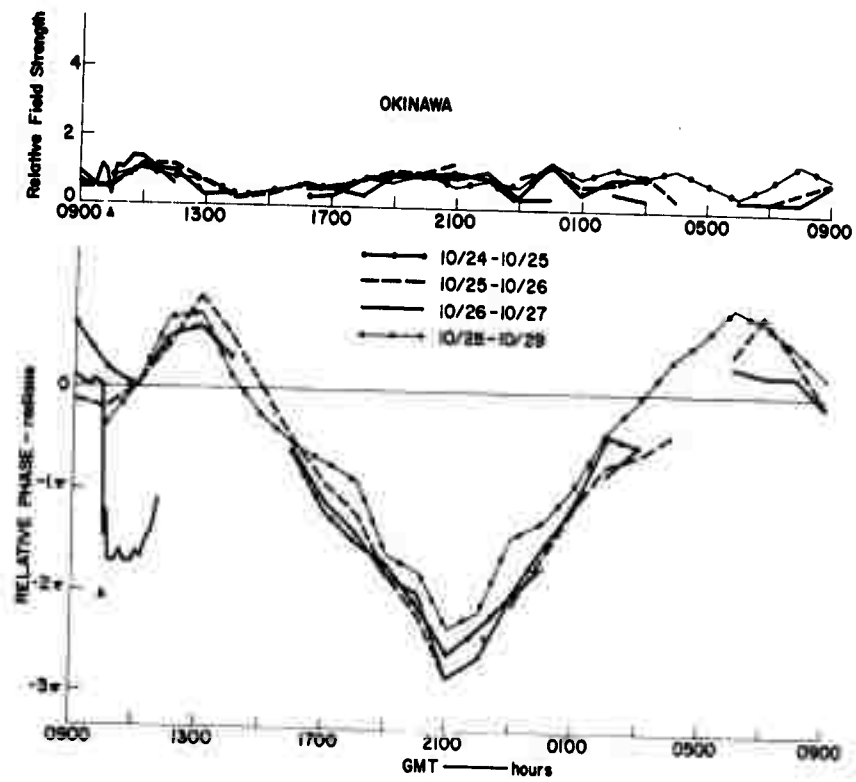


Figure 4.1 Diurnal amplitude and phase at Okinawa, Blue Gill.

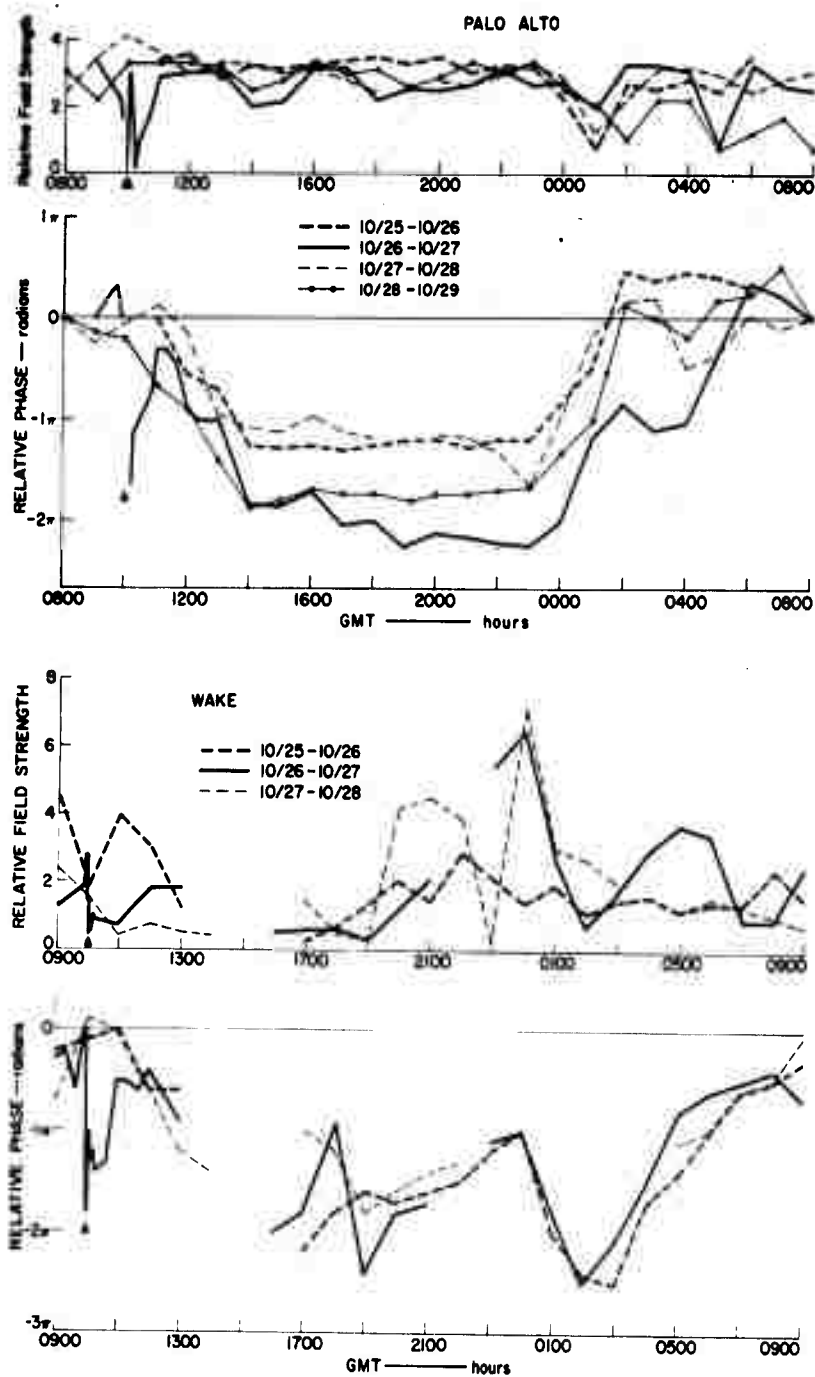


Figure 4.2 Diurnal amplitude and phase at Palo Alto and Wake, Blue Gill.

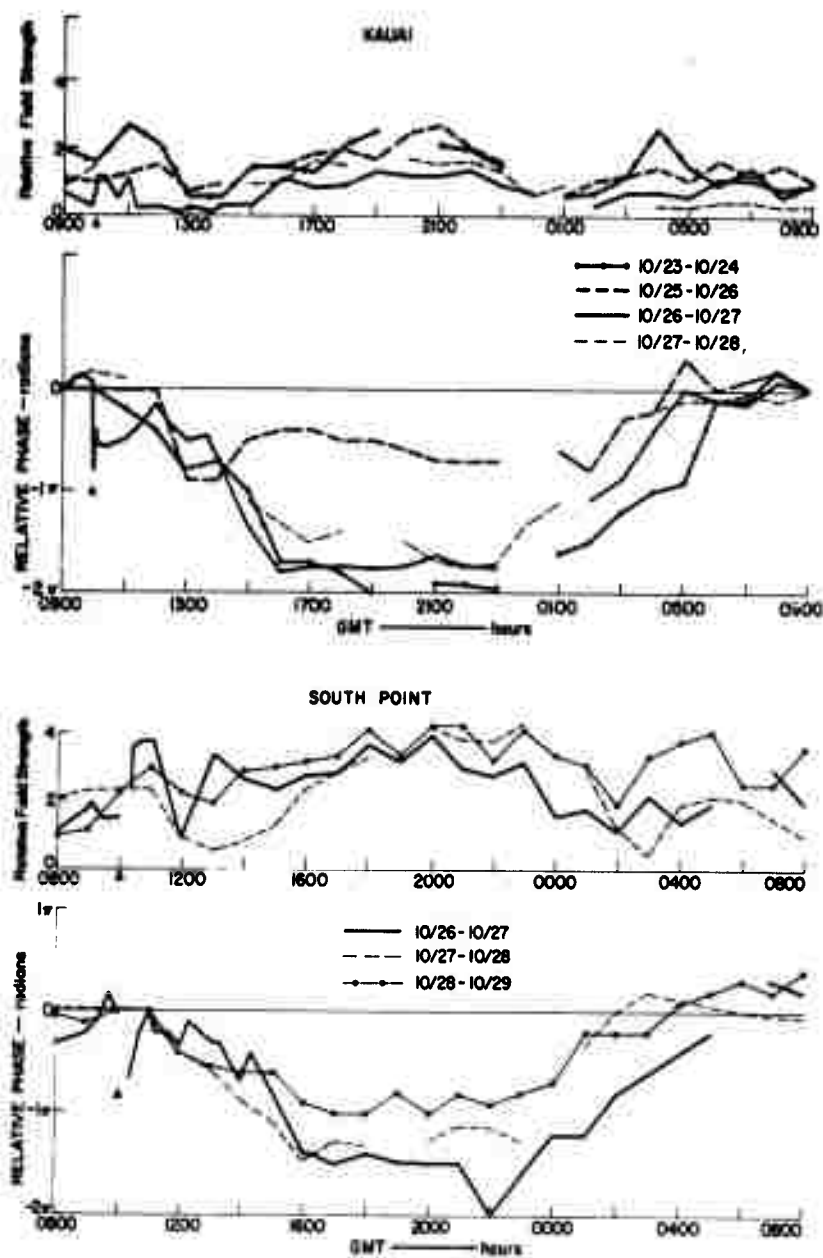


Figure 4.3 Diurnal amplitude and phase at Kauai and South Point, Blue Gill.

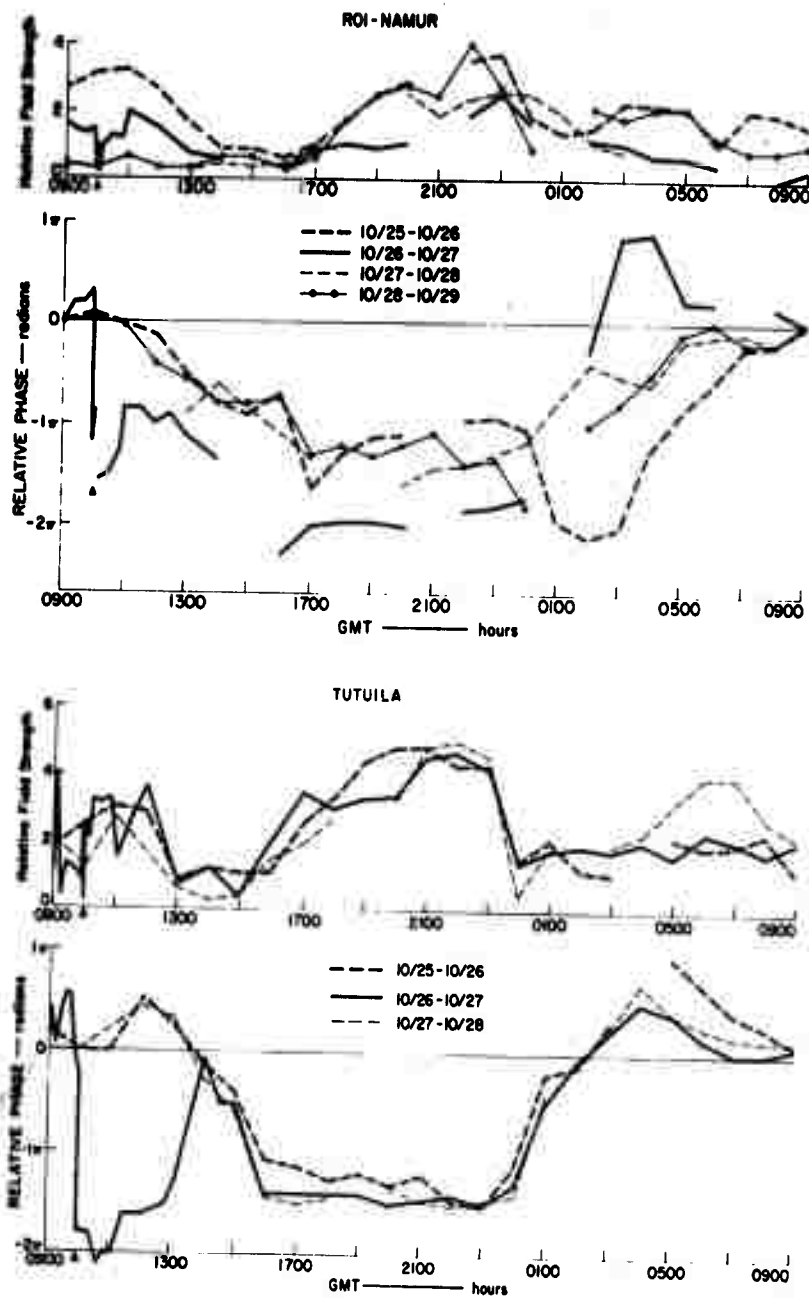


Figure 4.4 Diurnal amplitude and phase at Roi-Namur and Tutuila, Blue Gill.

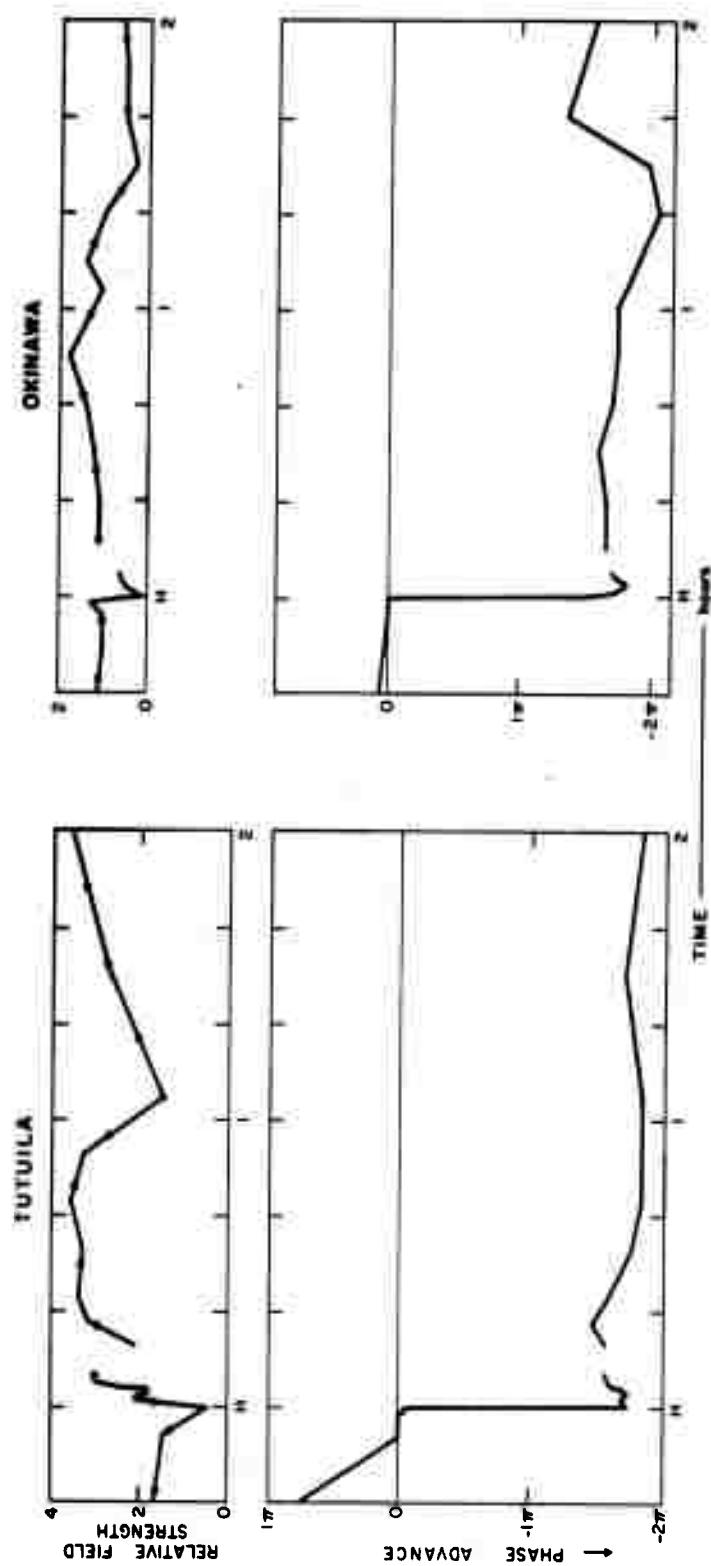


Figure 4.5 Amplitude and phase detail at Tutuila and Okinawa, Blue Gill.

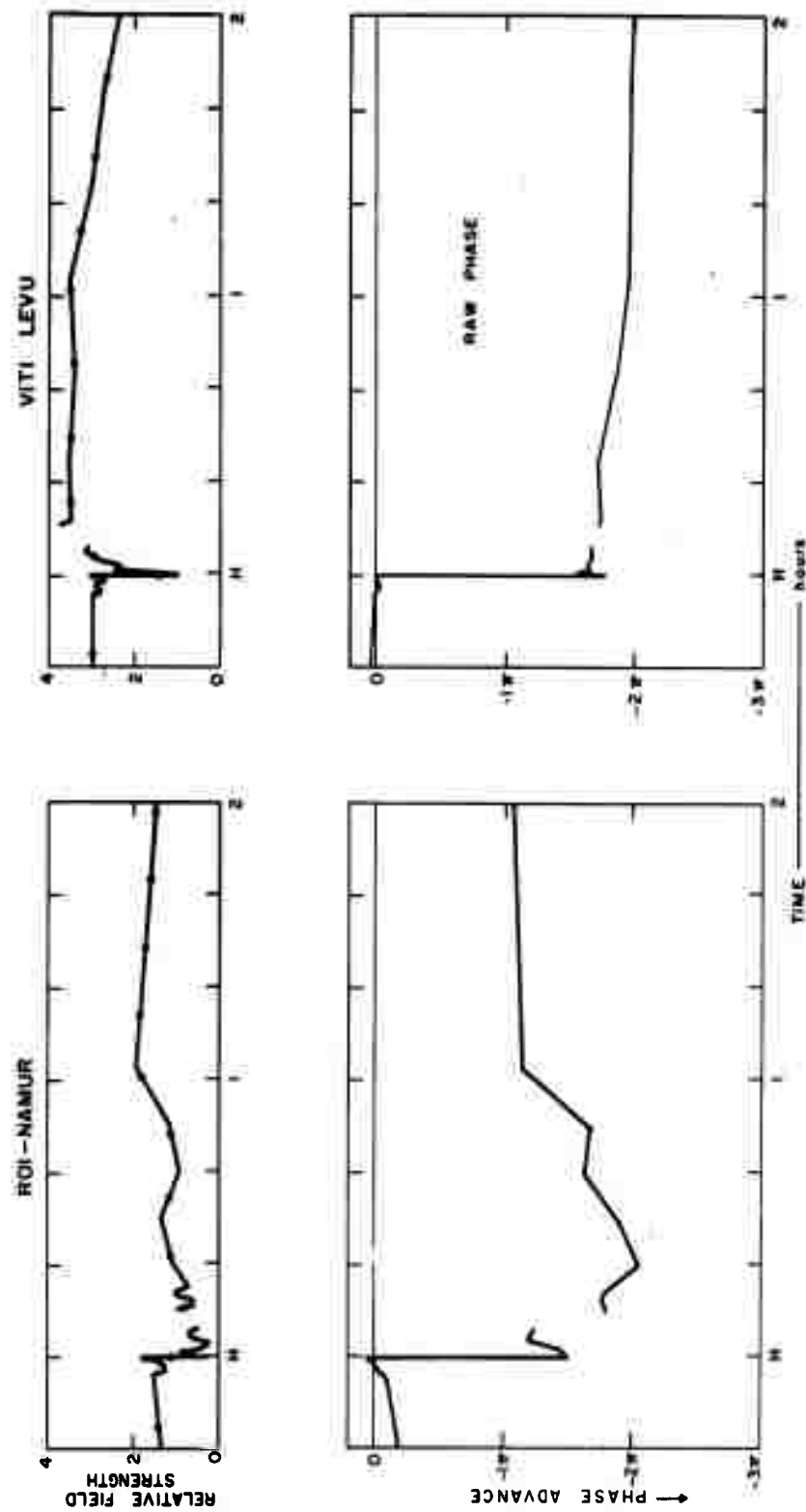


Figure 4.6 Amplitude and phase detail at Roi-Namur and Viti Levu, Blue Gill.

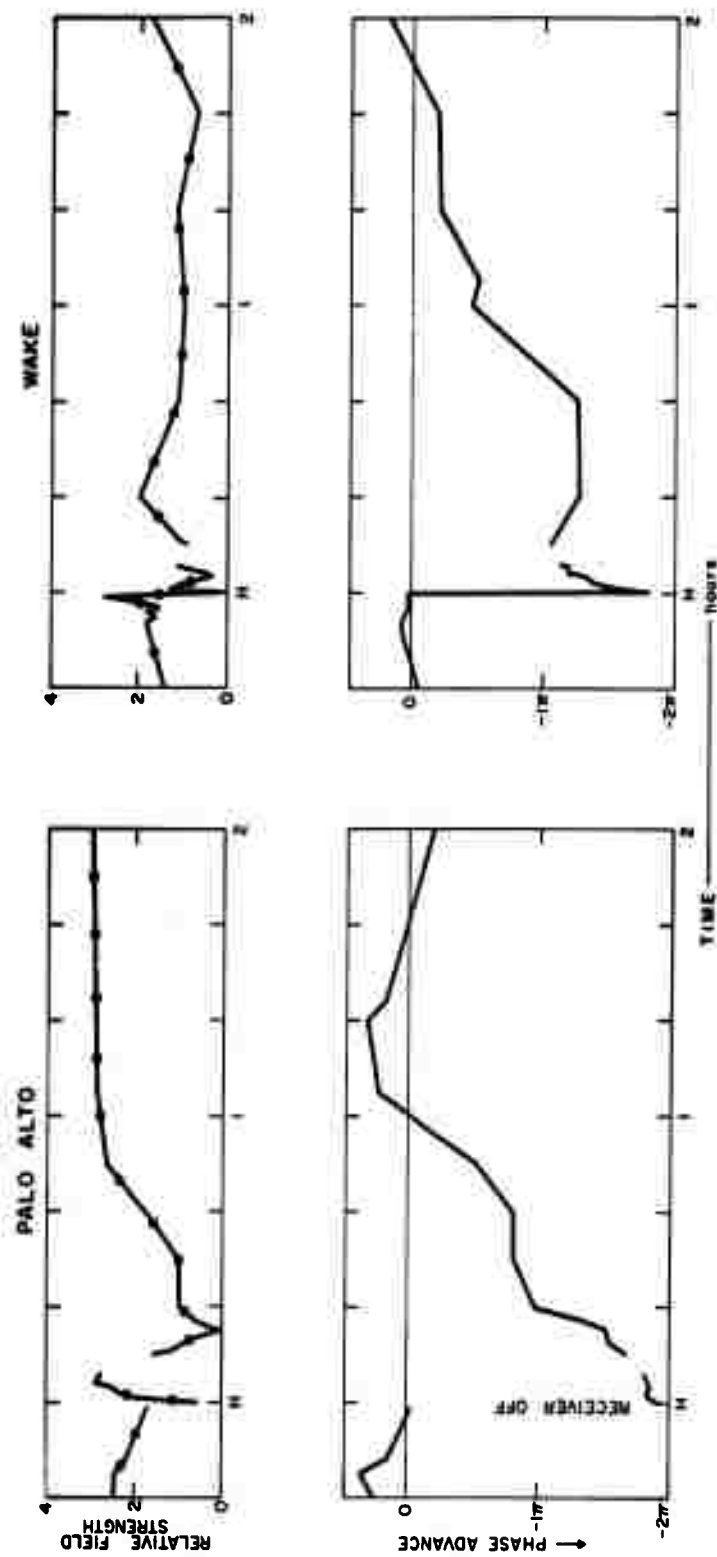


Figure 4.7 Amplitude and phase detail at Palo Alto and Wake, Blue Gill.

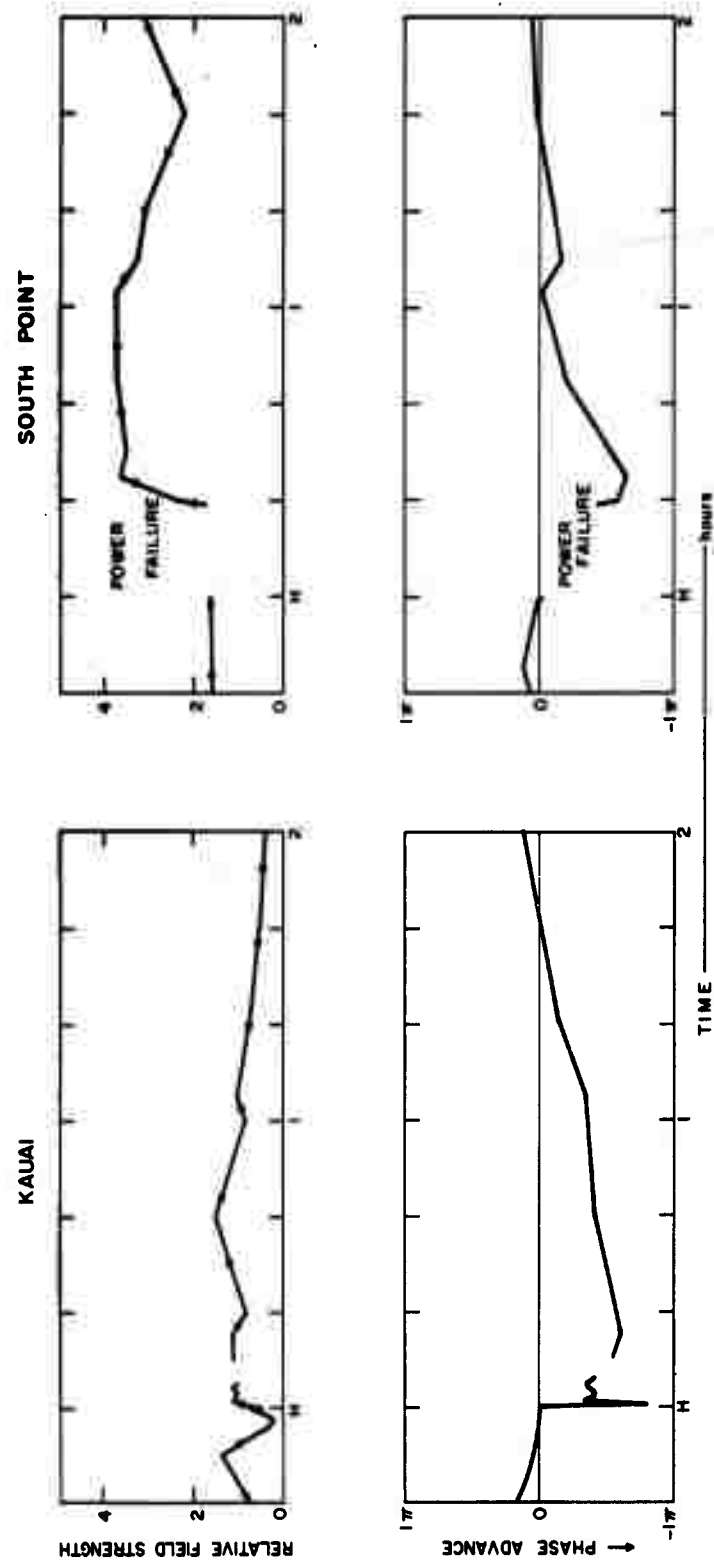


Figure 4.8 Amplitude and phase detail at Kauai and South Point, Blue Gill.

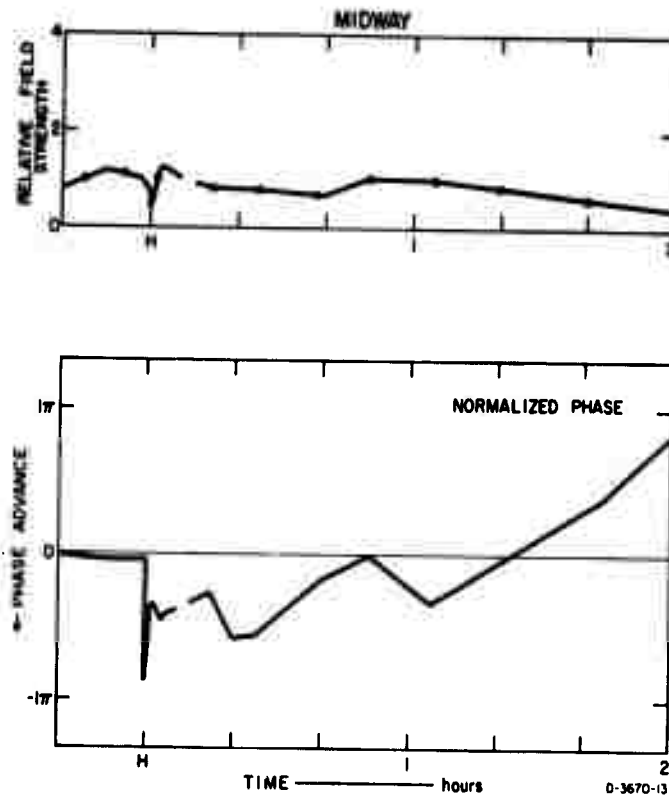


Figure 4.9 Amplitude and phase detail at Midway, Blue Gill.

CHAPTER 5

KING FISH

5.1 GENERAL

For the King Fish event on 1 November 1962, records were obtained from all receiver sites except Palo Alto. Effects of the event were apparent on all except Canton, Midway, Okinawa, and Rarotonga records.

The NBA transmitter was off the air, in its usual sequence, from 1207 to 1210; the King Fish event occurred at 1210:06 GMT. Average response time for the data system was 0.2 minute, so the first effects of the event would be obscured by the transition from noise level to signal level in most of the data. As a consequence, the data points at $H + 0$ minutes are actually at $H + 0.1$ minute, or later in cases where it was uncertain whether the system was responding rapidly enough. A gap has been left in the data curves to demonstrate this.

Ground sunrise at NBA for the King Fish event occurred at 1109 GMT, 1 hour before the event. Therefore, sunrise had already started to change propagation conditions on all paths by event time. Figures 5.1 through 5.3 show diurnal phase and amplitude data. Figures 5.4 through 5.7 show details of phase and amplitude from 20 minutes before until 2 hours after the event. (Figures are given at the end of this chapter.)

5.2 WAKE

The diurnal amplitude and phase variations of the NBA signal received at Wake are shown in Figure 5.1 for three consecutive days about the King Fish event. Midpath midnight was taken at 1100. The diurnal amplitude data for the period show fairly good agreement throughout most of the day, and a definite diurnal variation. In the event-day data, there is significant deviation from the normal level between H and H + 1 hour, when sig ' is attenuated drastically, and essentially lost for almost an hour.

The phase curves show a consistent diurnal behavior. The most notable feature of the event phase curve is the very large advance that was assumed at event time. It is not necessary to insert more than one cycle of advance to bring the data for the day into correspondence with the background. (Since the data at H + 1 minute are isolated from those taken during the rest of the day, they can be oriented without consideration of drift-slope) However, the data after H + 1 hour which indicate that phase is recovering from a drastically advanced position are governed by drift-slope orientation.

Details of amplitude and phase deviation at Wake are shown in Figure 5.7 for the immediate period about the event. The amplitude detail shows attenuation to 0.5 of the pre-event level immediately after H, abrupt increase to 0.7 at H + 0.5 minute, and a rapid decrease through 0.35 at H + 1.5 minutes. Signal has been lost by H + 2 minutes and does not return to a readable level until

H + 55 minutes. The signal level rises to 0.6 by H + 75 minutes and begins to fluctuate about the normal level for this hour, rising above normal level between H + 105 minutes and H + 3 hours.

The phase-deviation curve has been drawn to show an extreme advance of 4.2π immediately after H, but the portion of the phase curve between H and H + 1.5 minutes could be oriented at 2.2π or 0.2π without affecting the shape of the rest of the curve. The curve has been oriented as shown because no large advance occurring late after the event was found in the data from the other sites in the same general area of the Pacific. The initial advance shown is consistent with the recovery seen after H + 55 minutes. At H + 55 minutes, phase is seen to be recovering from an advance of at least 2.9π ; it continues to recover, reaching normal phase conditions by H + 4 hours.

5.3 KAUAI

The diurnal phase and amplitude of the NBA signal received at Kauai are shown in Figure 5.2 (top) for four consecutive days about the King Fish event. Midpath midnight was taken at 0900 GMT. The amplitude data show consistent daily behavior for all days shown, and some diurnal variation is apparent. The event-day curve shows no significant deviation from normal except for the enhancement at event time and a return to normal within 1 hour.

The diurnal phase curves show a large spread in the readings taken during the daylight hours, but conform well enough before 1400

to permit deviation comparison. The phase curve for 2-3 November falls near the average for the weekly period about the event. Drift-slope considerations imply a phase advance on event day. Phase recovers from a large advance at H to almost normal, then advances to a nearly constant position, and remains there until diurnal effect causes further advance near H + 3 hours. Coincidence with the normal position of advance occurs by H + 2 hours.

Details of phase deviation and amplitude for the event period are shown in Figure 5.5. System response for this site and event was changed to about 0.1 minute. Amplitude variation, in relation to the H - 3-minute level, shows enhancement to 2.5 immediately after the event, a decrease to 1.2 at H + 1 minute, and a return to 2.6 at H + 2 minutes. The level falls gradually to about 0.5 by H + 30 minutes, then begins to vary normally.

The phase-deviation data show phase returning from an advance of at least 1.6π immediately after the event and a very rapid recovery to 0.4π at H + 1.5 minutes. There is little change in deviation until H + 10 minutes, then an advance to 0.6π occurs by H + 20 minutes. Very gradual recovery after H + 20 minutes brings phase to normal by H + 2 hours.

5.4 SOUTH POINT

The diurnal amplitude and phase variations at South Point are shown in Figure 5.2 (bottom) for three consecutive days about the

King Fish event. Midpath midnight was taken at 1000 GMT. There is good agreement during the morning among the diurnal amplitude curves shown, but considerable spread is apparent in the afternoon and near midnight. The diurnal variation is clearly evident. The amplitude curve for event day shows little deviation from normal in the hours near the event, but the fluctuation just after event time is notable, showing short-term enhancement following the probable attenuation at H.

The diurnal phase curves show fairly good day-to-day agreement throughout much of the day. There is some spread in the afternoon which may be attributed to low signal level. The phase data for the event day actually show an advance at H, and there is a further advance near $H + 30$ minutes. After that, diurnal effect seems to predominate, but phase remains advanced until $H + 6$ hours.

Details of phase deviation and amplitude are shown in Figure 5.5 for South Point. In reference to the level at $H - 5$ minutes, amplitude shows attenuation immediately after the event to 0.3, rises abruptly to 0.7 at $H + 0.3$ minute, and continues rising to 1.6 at $H + 1$ minute. The signal then drops to 1.0 at $H + 1.5$ minutes, remains there for 2.5 minutes, then drops to 0.15 at $H + 10$ minutes, and fluctuates about the normal level for the remainder of the day.

The phase-deviation curve shows a rapid advance immediately after H of 0.8π by $H + 0.5$ minute, slight recovery to 0.6π at $H + 3$ minutes, advance to 0.8π at $H + 3.5$ minutes, and a further advance to

about 1.0π by $H + 30$ minutes, where recovery begins. Phase has recovered to within about 0.4π of normal by $H + 55$ minutes, but remains slightly advanced until $H + 6$ hours.

5.5 VITI LEVU

The diurnal phase and amplitude variations of the NBA signal received at Viti Levu are shown in Figure 5.3, for King Fish event day and the following day. Midpath midnight was taken at 1000 GMT. There is considerable day-to-day spread in the diurnal amplitude data, but a diurnal characteristic variation is readily apparent, since signal level is relatively high. Considerable attenuation is shown in the event data after H , for about 1 hour, until diurnal effects bring the curves into near coincidence. The large attenuations at 1700 and 2200 GMT on event day have no known significance.

The diurnal phase curves show spread in the data during the daylight hours for a number of days near the event period. Behavior in the early morning hours was sufficiently consistent to allow a deviation comparison. The large phase shift in the event curve at H is implied in the data, mainly by drift-slope considerations, but there is also good correlation with the background variation between 1400 and 1700 GMT. (The curve for 2-3 November is approximately characteristic of the usual diurnal variation during these hours.)

Details of phase deviation and amplitude are shown in Figure 5.4 for the immediate event period. In reference to the level at $H - 5$

minutes, amplitude undergoes an attenuation to 0.3 immediately after the event, holds that level until $H + 2$ minutes, and then decreases slightly to 0.27 at $H + 2.5$ minutes. From $H + 2.5$ to $H + 35$ minutes, the level increases gradually to about 0.4, held until $H + 55$ minutes. Signal level is near normal between $H + 75$ and $H + 95$ minutes, but increases again after $H + 115$ minutes.

The phase-deviation curve shows an advance of 1.6π immediately after H , then slightly more advance until $H + 2$ minutes, where a rapid retardation occurs, to 1.3π at $H + 3.5$ minutes. There is abrupt advance to 1.5π at $H + 5.5$ minutes, where recovery begins rapidly; it continues more gradually after $H + 14$ minutes (0.8π) until $H + 55$ minutes, to 0.2π , which is near normal. The advance after $H + 55$ minutes is probably caused by normal diurnal changes. The phase remains advanced from normal until about $H + 3$ hours.

5.6 FAIRBANKS

At Fairbanks the local frequency standard was adjusted 40 minutes prior to the King Fish event, so oscillator drift-slope is in doubt for the immediate period of the event. Recording level was low on this record. In addition, system recovery after the transmitter off-period ($H - 3$ minutes to H) is apparently slow, so readings before $H + 1$ minute could not be used. Phase points throughout the period of the event show a scatter of $\pm 0.1\pi$; amplitude points are scattered as well.

Amplitude detail and phase data in raw form for the NBA signal received at Fairbanks are shown in Figure 5.4. With reference to the pre-event level, and assuming an average through the amplitude curve shown, the signal level drops to about 0.5 between $H + 1$ and $H + 2$ minutes. There is an apparent recovery to about 0.9 between $H + 3$ and $H + 4$ minutes; then the average level drops to about 0.6 between $H + 4$ and $H + 12$ minutes, and rises to 1.0 between $H + 12$ and $H + 16$ minutes. Another decrease follows, to about 0.7 by $H + 30$ minutes. The level rises from there to about normal by $H + 1$ hour. The general effect between H and $H + 1$ hour is a 30-percent decrease in signal level and a return to normal.

An average is assumed through the phase curve shown; there is apparently no change in phase through the event, with an advance of about 0.3π occurring very rapidly between $H + 1$ and $H + 2$ minutes, followed by immediate recovery to about 0.15π at $H + 3$ minutes. The data show a gradual phase advance for about 3 hours, which seems to be normal sunrise effect. A phase variation between H and $H + 1$ hour, attributable to the event, seems to be superimposed on the long-term advance effect.

5.7 ROI-NAMUR

Slope variation was established for the days through the King Fish event, but background data showed too much inconsistency for meaningful comparisons. Figure 5.6 shows the amplitude and normalized

phase details of Roi Namur data. The phase data have simply been normalized to the drift-slope of -0.98 radian per hour. Scattering of phase points after the event, in the period when signal is low, indicates that the true phase curve is probably an average drawn through the data shown. If an average variation is assumed, the initial phase advance is about 1.2π , with a probable further shift to some 1.6π between $H + 1$ and $H + 6$ minutes (rapid enough, possibly, to be considered a second stage of the initial advance). Partial recovery occurs from there to about 1.5π by $H + 15$ minutes; then very slow final recovery follows. Data are lost from $H + 115$ minutes to $H + 5$ hours, so that recovery time is uncertain, but less than 5 hours. The advance at H was assumed in lieu of showing a 0.8π retardation; either is possible in view of the gap in data after $H + 2$ hours.

The amplitude-detail curve shows, relative to the pre-event level, an attenuation at event time to about 0.2, a gradual increase to about 0.3 by $H + 15$ minutes, and then no appreciable change through $H + 115$ minutes. The level coincides with normal background by $H + 20$ minutes, since signal is usually attenuated during this period of the day.

5.8 TUTUILA

Background diurnal phase characteristics for the period about the King Fish event are too irregular to use for comparison, but

At the southern-area sites, effects were observed at Viti Levu and Tutuila, with the larger disturbance at Viti Levu indicating a well-defined conjugate-area disturbance. Phase at these two sites was advanced by the event, with recovery in about an hour. Amplitude was attenuated at event time, with a recovery and possible enhancement at Tutuila and continued attenuation at Viti Levu.

At northern-area sites, effects were observed at all sites except Midway, the Midway path being the farthest from the event area. Effects in the northern area are somewhat inconsistent, since South Point and Kauai give dissimilar results, and Wake and Roi-Namur have incomplete data. All northern sites show phase advances, with the largest effect observed at Wake, although the validity of the Wake data is doubtful.

Data are shown for a disturbance at Fairbanks, but no effect was recorded at Okinawa. The principal effect at Fairbanks is a signal attenuation accompanied by slight phase effect, which is somewhat unreasonable.

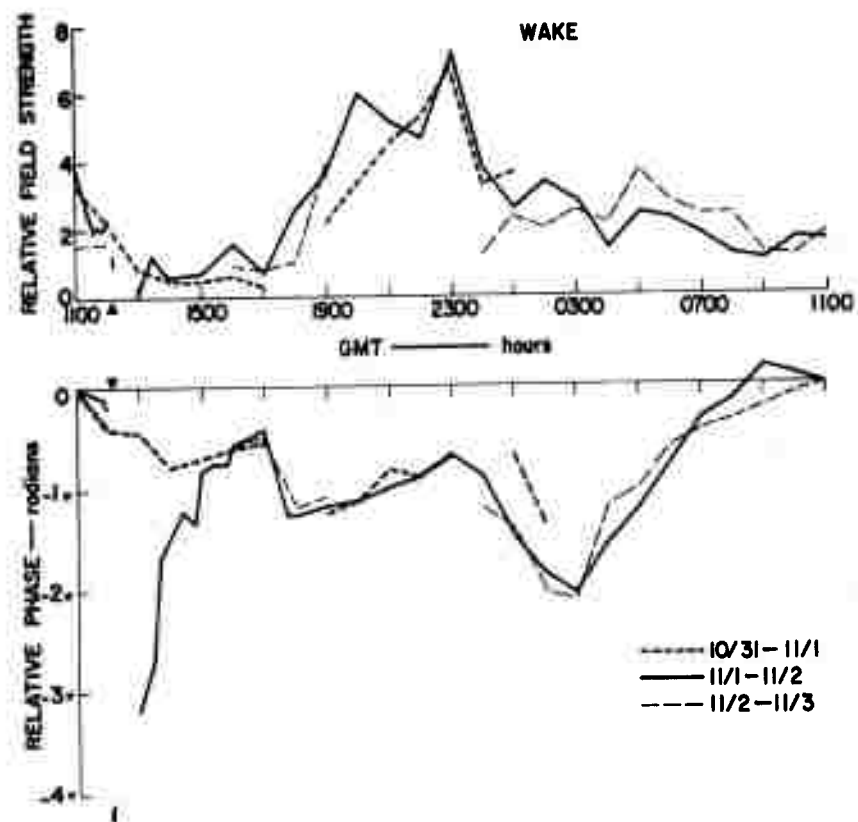


Figure 5.1 Diurnal amplitude and phase at Wake, King Fish.

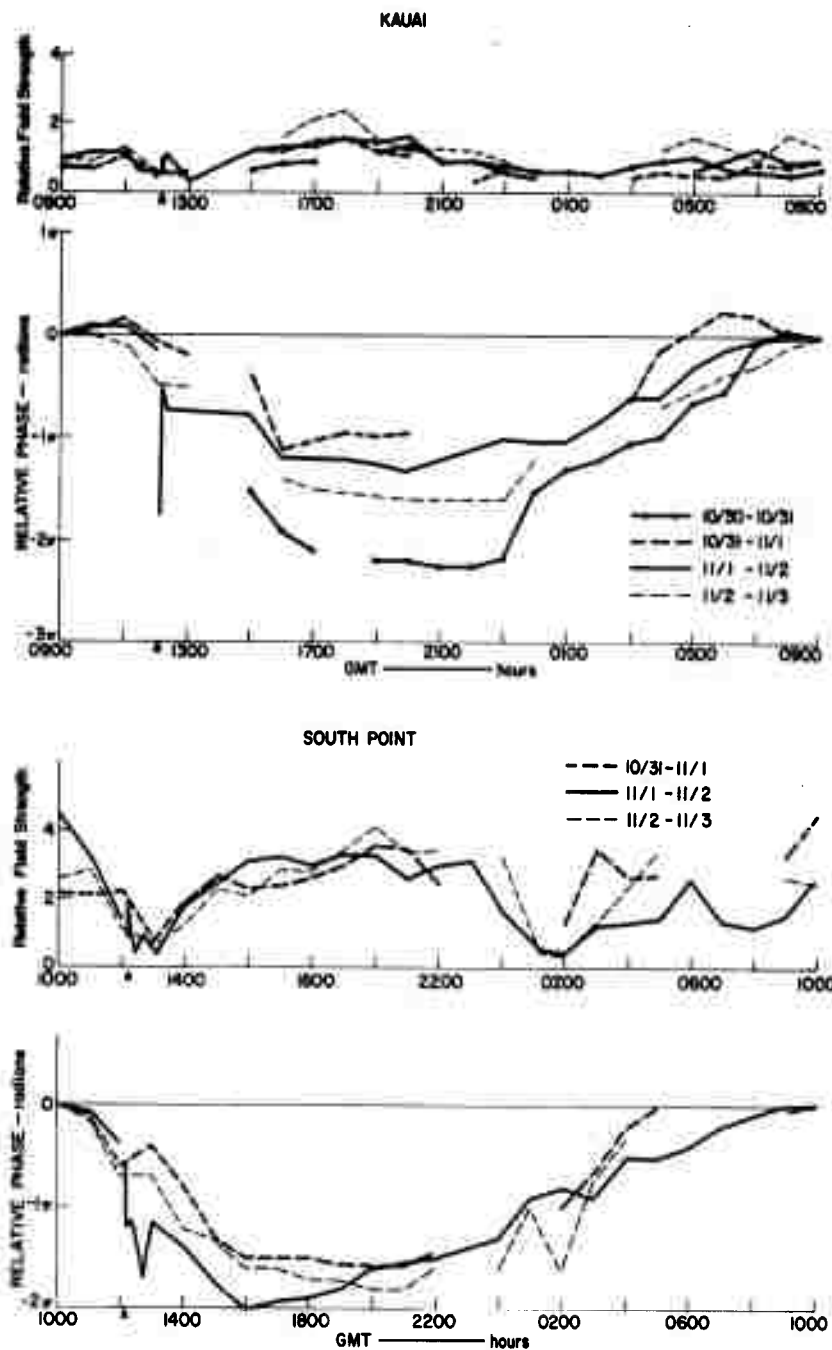


Figure 5.2 Diurnal amplitude and phase at Kauai and South Point, King Fish.

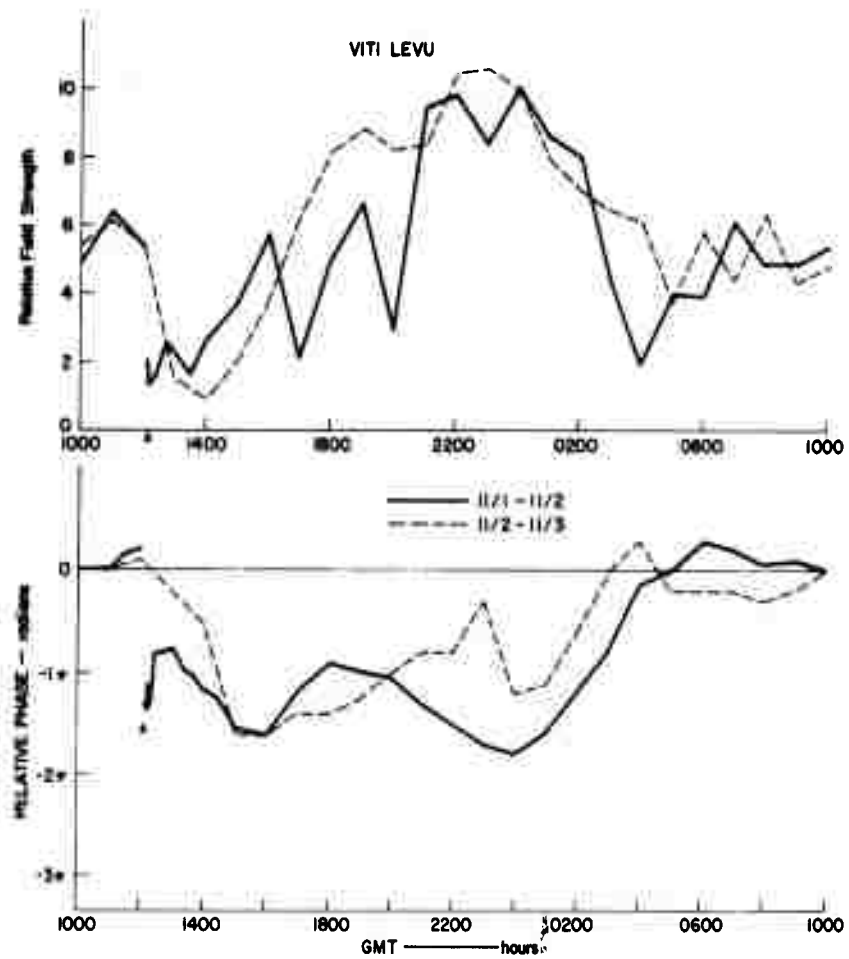


Figure 5.3 Diurnal amplitude and phase at Viti Levu, King Fish.

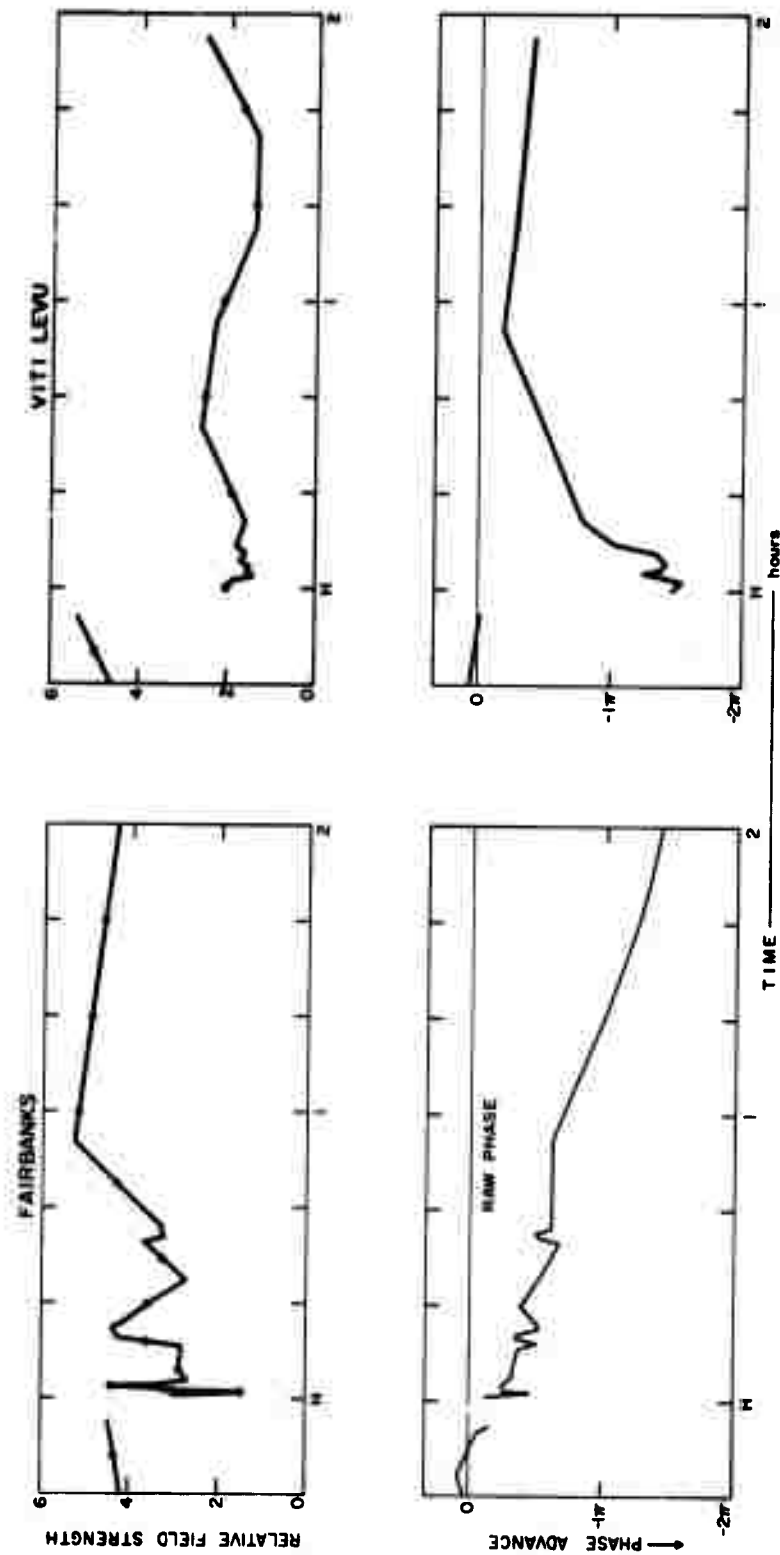


Figure 5.4 Amplitude and phase detail at Fairbanks and Viti Levu, King Fish.

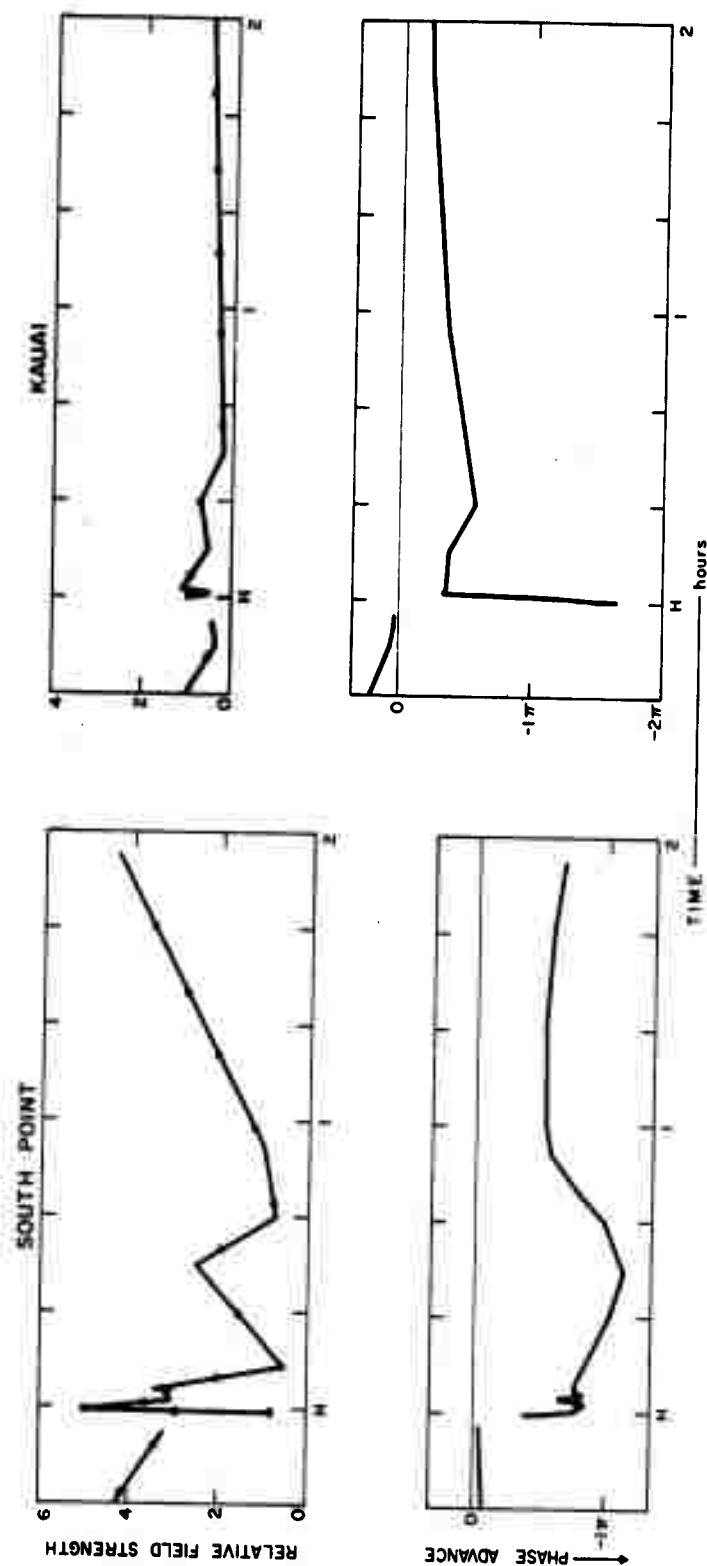


Figure 5.5 Amplitude and phase detail at South Point and Kauai, King Fish.

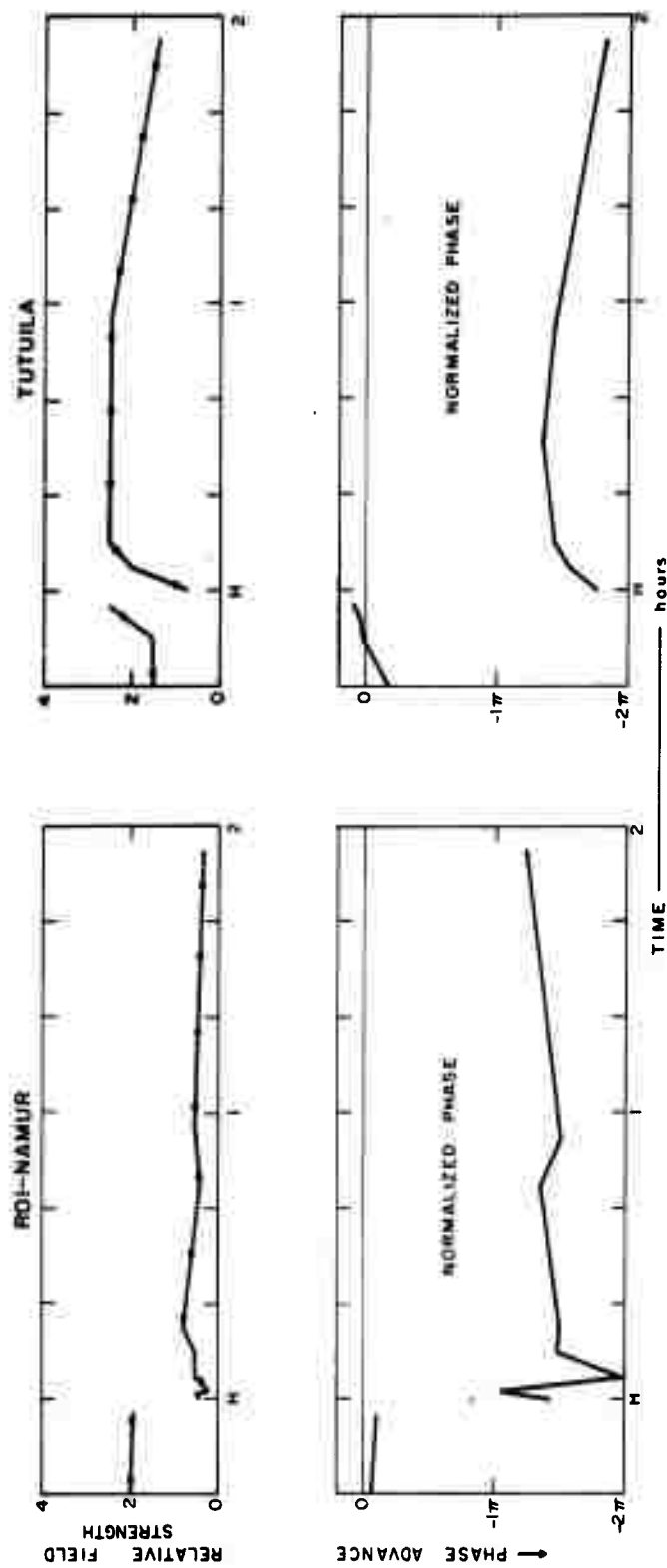


Figure 5.6 Amplitude and phase detail at Roi-Namur and Tutuila, King Fish.

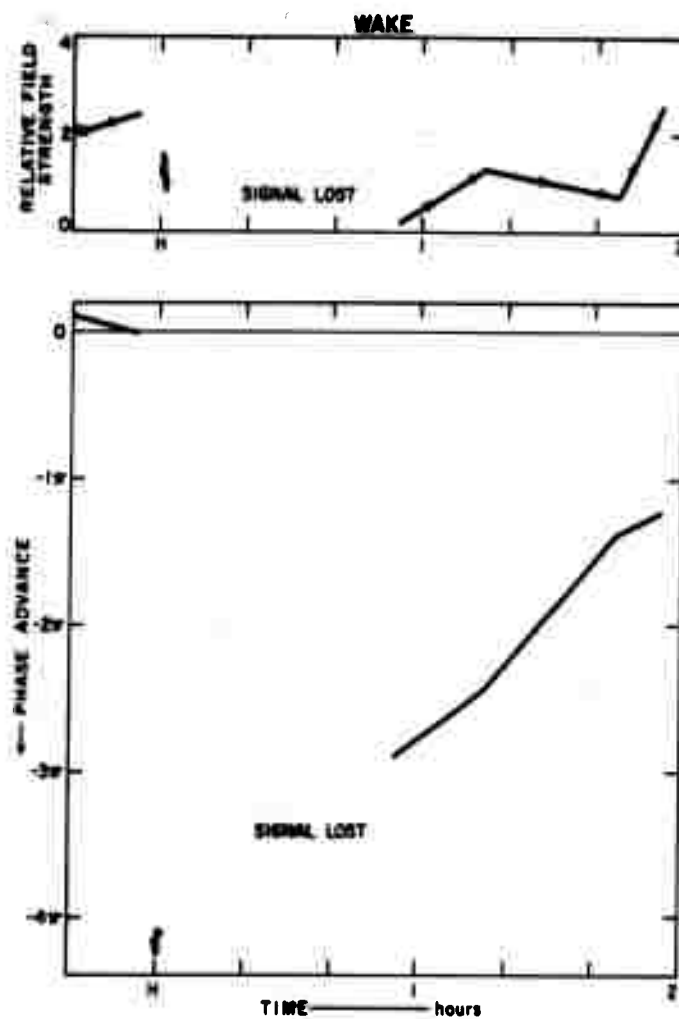


Figure 5.7 Amplitude and phase detail at Wake, King Fish.

CHAPTER 6

DISCUSSION OF RESULTS

The results presented in this report define measurements made on the received amplitude and phase of the 18-kc transmissions from NBA, Canal Zone. Since these data were recorded for another purpose, the paths that resulted were not optimum for defining nuclear-event effects on VLF propagation. Therefore, the results presented here are limited to a description of the data and do not include an interpretation of the observed effects in terms of event parameters or ionospheric effects.

Five high-altitude events occurred during the Fish Bowl series. One of these events, Star Fish, occurred during July 1962, and the other four events occurred within a 16-day period beginning in October (Table 1.1). This latter grouping to some extent influenced the observed VLF effects. For Star Fish, all sites showed an immediate signal attenuation followed by a recovery to normal level within 4 minutes in many instances. Phase at all sites¹ was advanced by the event, the advance being apparently instantaneous at all sites

¹The sites can be grouped into northern (Roi-Namur, Wake, Midway, Kauai, and South Point), southern or conjugate (Viti Levu, Tutuila, and Rarotonga), and remote (Okinawa, Fairbanks, and Palo Alto). Canton is unique in that it is at the magnetic equator between the northern and conjugate areas.

except Canton and Palo Alto. There is evidence of delayed phase advances (possibly two stages) in the conjugate area and to the east of the immediate event area, within 3 minutes of the Star Fish event. Some sites responded only to the later phase advances (Canton, for example).

All sites observed a disturbance associated with the Check Mate event, except possibly Fairbanks. Amplitude variations were small with both signal increases and decreases being recorded. Signal recovery to normal was rapid after the event. Phase variations at the northern-area sites showed phase advances returning to normal in 1 or 2 hours. The remote-area sites and Canton also showed phase advances that persisted for several hours. The conjugate area, however, showed phase retardations reaching a maximum in 20 minutes and returning to normal in about 1 hour. This phase retardation was not expected, and all known data-processing techniques and interpretations that could result in a phase advance were tried to no avail.

The Blue Gill event occurred within 6 days of the Check Mate event. Amplitude of the received NBA signal showed an attenuation at all sites except Canton (Fairbanks and Rarotonga did not obtain records), followed immediately by an enhancement. At some sites, this enhancement resulted in signal amplitudes above normal. At Palo Alto a second attenuation was observed at 15 minutes after

the event. At all sites, the phase of the received NBA signal showed an advance at event time, with recovery at the northern-area sites within 2 hours, and recovery at the conjugate-area sites in some 4 hours.

Blue Gill showed two distinct affected areas. In the northern area, most sites observed the King Fish event as a phase advance, while Midway showed no effect. Canton did not show any effect, giving evidence of a limited disturbed area around the event. In the conjugate area, Viti Levu and Tutuila observed a phase advance (no effect was observed at Rarotonga) giving evidence of a well-defined conjugate area. The remote paths showed no significant effect from King Fish.

Tight Rope gave no evidence of a disturbance on any of the NBA paths that were monitored.

The results presented here were obtained by a system designed and installed primarily as a device to control the frequency of a local standard. These results demonstrate that diligent use of all available systems during a nuclear-test series can result in additional useful data.

APPENDIX TABULATIONS OF SPECTRUM GAPS

TABLE A.1 ROI-NAMUR TO HAWAII, STAR FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	EMGD AVERAGE	SINGLE EMGD DAY
0900	222							042	.011	.122	.186
0920	226							040	.156	.344	.243
0940	233							040	.041	.035	.645
1000											.001
1020											.000
1040	133							042	.000	.149	.265
1100	234							057	.226	.021	.000
1120	259							060	.085	.070	.000
1140	268							065	.015	.033	.032
1200	312	223-198						063	.092	.010	.000
1220	313							054	.042	.016	.000
1240	317	276-265						044	.037	.076	.152
1300	318							048	.033	.018	.055
1320	311							052	.012	.000	.000
1340	310							044	.008	.041	.000
1400	288							041	.000	.017	.037
1420	294							041	.000	.044	.111
1440	299							042	.121	.075	.069
1500	296							044	.024	.058	.000
1520	295							049	.008	.021	.000
1540	293							042	.076	.081	.000
1600	261	263-244						044	.000	.092	.000
1620	120							041	.101	.112	.053
1640	089							041	.000	.022	.000
1700	096							040	.000	.063	.063
1720	154							055	.303	.000	.053
1740								065	.000	.000	.000
1800	197							096	.000	.011	.000
1820	207							066	.132	.018	.000
1840	218							073	.128	.000	.000
1900	182							069	.000	.000	.000
1920	209							094	.000	.000	.000
1940	208							101	.060	.000	.000
2000	218							083	.162	.000	.000
2020	219							098	.000	.000	.000
2040	209										.000

0900 GMT 9 JULY

TABLE A.1 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	201							093	000	.000	.000
2120	195							104	000	.000	.000
2140	179							092	000	.000	.000
2200	190							090	000	.000	.000
2220	205							073	.114	.000	.000
2240	188					086-075		068	.033	.000	.000
2300	222					079-077		074	.034	.000	.000
2320	215					080-077		070	.021	.000	.000
2340	219							085	000	.007	.000
0000										.000	.000
0020										.000	.000
0040										.000	.000
0100	219							086	000	.000	.000
0120	213							086	.047	.000	.000
0140	224					153-147		085	000	.000	.000
0200	220							077	000	.032	.000
0220	232							072	000	.000	.000
0240	241							062	000	.004	.000
0300	262							078	000	.000	.000
0320	280							072	000	.000	.000
0340	313							081	000	.015	.000
0400	342							084	000	.091	.013
0420	354							040	000	.042	.078
0440	379							046	000	.087	.000
0500	356							102	.169	.034	.000
0520	310					112-106		092	000	.007	.014
0540	292							079	000	.000	.000
0600	281							079	000	.023	.000
0620	270							062	000	.027	.022
0640	305							041	.028	.052	.000
0700	309							041	.026	.104	.000
0720	267							041	000	.163	.000
0740	276							042	.026	.122	.114
0800	278							042	.030	.057	.133
0820	283							041	.107	.072	.000
0840	224					193-174		041	000	.000	.000

TABLE A.2 ROI-NAMUR TO KAUAI, STAR FISH

0900 GMT 9 JULY							0900 GMT 9 JULY	
TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY
0900	199	101-094 115-087 123-093 099-093	164-116 173-118	145-100	123-105	079-055	041	000
0920	175						041	.179
0940	126						040	.000
1000	109						047	.000
1020	141						045	.113
1040	141						045	.292
1100	147						045	.313
1120	258						045	.059
1140	265						045	.000
1200	311						045	.000
1220	289	079-055	164-116 173-118	145-100	123-105	079-055	040	.000
1240	307						045	.000
1300	315						048	.000
1320	303						041	.000
1340	282						048	.056
1400	264						040	.016
1420	269						040	.000
1440	257						041	.000
1500	277						042	.000
1520	269						040	.000
1540	243	101-094 115-087 123-093 099-093	164-116 173-118	145-100	123-105	079-055	047	.000
1600	271						040	.000
1620	213						042	.000
1640	197						067	.013
1700	226						087	.058
1720	184						107	.174
1740	224						085	.000
1800	199						084	.000
1820	201						118	.000
1840	215						090	.000
1900	210	079-055	164-116 173-118	145-100	123-105	079-055	067	.008
1920	206						093	.025
1940	206						129	.000
2000	206						000	.000
2020	206						000	.000
2040	206						000	.000

TABLE A.2 CONTINUED

TIME	MOF	GAPS IN MF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	202							116	000	.000	.000
2120	194							097	000	.000	.000
2140	197							100	000	.000	.000
2200	201							090	000	.007	.022
2220	190							097	000	.000	.000
2240											
2300	219							105	000	.000	.000
2320	222							103	.252	.000	.000
2340	225	207-192	162-147	155-144				095	.085	.004	.009
0000	235							105	.000	.006	.018
0020	214							099	000	.000	.000
0040	218							106	000	.000	.000
0100	226							095	000	.016	.000
0120	204							093	000	.000	.000
0140	207							099	000	.000	.000
0200	249							105	000	.000	.000
0220	226							074	000	.000	.000
0240	235							073	000	.004	.000
0300	245							097	000	.000	.000
0320	251							090	000	.000	.000
0340	274							087	000	.000	.000
0400	294							106	000	.000	.000
0420	388							107	000	.000	.000
0440	319							089	000	.000	.000
0500	313							080	000	.000	.000
0520	285							095	000	.019	.000
0540	296							061	000	.000	.000
0600	279							049	000	.000	.000
0620	274							055	000	.000	.000
0640	258							042	000	.000	.000
0700	267							042	000	.000	.000
0720	251							042	000	.000	.000
0740	256							042	000	.000	.000
0800								042	000	.000	.000
0820	287							042	000	.000	.000
0840	276							042	000	.000	.000

TABLE A.3 CANTON TO FAIRBANKS, STAR FISH

0900 OCT 9 JULY

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0900	195							040	000	.000	.000
0920	116							051	000	.000	.000
0940	040							040	B	.000	.000
1000											
1020	040							040	B	.000	.000
1040											
1100											
1120											
1140											
1200											
1220											
1240											
1300											
1320											
1340											
1400											
1420	040							040	B	.000	.000
1440											
1500											
1520											
1540	149										
1600	069							056	000	.000	.000
1620	128							056	000	.000	.000
1640								084	000	.000	.000
1700	040							040	B	.000	.000
1720	161										
1740	156							085	000	.000	.000
1800	192							080	000	.000	.000
1820	183							082	064	.000	.000
1840								094	000	.000	.000
1900	187										
1920	181							116	000	.000	.000
1940	192							122	000	.000	.000
2000	187							122	000	.000	.000
2020	186							117	000	.000	.000
2040	192							122	000	.000	.000
								115	000	.000	.000

TABLE A.3 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	200							116	000	.000	.000
2120	211							115	000	.000	.000
2140	214							116	000	.000	.000
2200	221							150	000	.000	.000
2220	201							150	000	.000	.000
2240	183							139	000	.000	.000
2300											.000
2320											.000
2340											.000
0000											.000
0020											.000
0040											.000
0100	169							115	000	.000	.000
0120											.000
0140											.000
0200											.000
0220	211							134	000	.000	.000
0240	211							125	000	.000	.000
0300	200							132	000	.000	.000
0320	186							163	000	.000	.000
0340	170							144	000	.000	.000
0400	174							116	000	.000	.000
0420											.000
0440											.000
0500	135							113	000	.000	.000
0520	153							109	000	.000	.000
0540											.000
0600											.000
0620	184							055	000	.000	.000
0640	191							049	000	.000	.000
0700	198							040	000	.000	.000
0720	192							041	000	.000	.000
0740	200							041	000	.000	.000
0800	196							040	000	.000	.000
0820	197							040	000	.000	.000
0840											.000

TABLE A.4 CANTON TO MIDWAY, STAR FISH

0900 GRT 9 JULY										
TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY	WKGD AVERAGE	SINGLE BKGD DAY
0900	040						040	B	.107	.000
0920	221						052	.556	.033	.000
0940	182						065	.436	.000	.000
1000	040						040	B	.025	.000
1020	040						040	B	.068	.000
1040	171						063	.509	.024	.000
1100	160						118	.333	.000	.000
1120	040						040	B	.041	.000
1140	040						040	B	.000	.000
1200	040								.000	.000
1220									.000	.000
1240									.000	.000
1300	127						064	.556	.000	.000
1320	137						054	.687	.000	.000
1340	110						062	.417	.135	.000
1400									.000	.000
1420	155								.000	.000
1440	182								.000	.000
1500	190								.000	.000
1520	227								.000	.000
1540	175								.000	.000
1600	185								.000	.000
1620	122								.000	.000
1640	158								.000	.000
1700	115								.000	.000
1720									.000	.000
1740	151								.000	.000
1800	179								.000	.000
1820	178								.000	.000
1840	177								.000	.000
1900	174								.000	.000
1920	040								.000	.000
1940	040								.000	.000
2000	184								.000	.000
2020	183								.000	.000
2040	188								.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
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									.000	.000
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									.000	.000
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									.000	.000
									.000	.000
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									.000	.000
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									.000	.000
									.000	.000
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									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
									.000	.000
</										

TABLE A.4 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	184		141-136	128-120				101	.060	.000	.000
2120	183							110	.110	.000	.000
2140	185		156-146	140-131				125	.317	.000	.000
2200	191							106	.000	.000	.000
2220	173		146-140					138	.171	.000	.000
2240	159		140-136					087	.056	.000	.000
2300											.000
2320	160							083	.000	.000	.000
2340	159							085	.000	.000	.000
0000	175							101	.000	.017	.000
0020	183							106	.000	.000	.000
0040	183							078	.000	.000	.000
0100	204			115-112	108-105			067	.057	.000	.000
0120	230		161-143					122	.131	.078	.000
0140	247		157-152					112	.046	.000	.000
0200	253		135-130					108	.037	.000	.000
0220	253							113	.000	.000	.000
0240	304							117	.000	.083	.249
0300	315							104	.000	.055	.165
0320	373							119	.000	.115	.230
0340	384							111	.201	.167	.167
0400	334	279-228 251-225 302-231						084	.095	.094	.094
0420	306							090	.284	.000	.000
0440	312							085	.000	.000	.000
0500	296							077	.000	.000	.000
0520	260							090	.100	.081	.000
0540	267	243-226 217-201						077	.084	.057	.000
0600	282							056	.000	.061	.000
0620											.000
0640	248							057	.000	.000	.000
0700	236							040	.000	.000	.000
0720											.000
0740											.000
0800											.000
0820	274							040	.000	.080	.000
0840	257							040	.000	.305	.000
0840	253							040	.000	.000	.000

TABLE A.5 KAUAI TO WAKE, STAR FISH

0900 ONE 9 JUL

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BROOD AVERAGE	SINGLE BROOD DAY
0900	131							042	.573	.369	.098
0920	076							042	.000	.071	.256
0940	086							040	.000	.077	.162
1000	109							040	.101	.163	.084
1020	079							041	.000	.087	.087
1040	083							044	.000	.099	.175
1100	079							051	.000	.148	.257
1120	080							045	.086	.057	.132
1140											.324
1200											.100
1220	154							085	.116	.135	.000
1240	116							065	.000	.057	.000
1300	121							047	.149	.122	.122
1320	113							065	.000	.000	.000
1340	189							086	.000	.000	.000
1400	092							065	.000	.000	.000
1420	168							047	.058	.000	.117
1440	249							041	.197	.021	.041
1500	179							040	.000	.068	.068
1520	179							040	.000	.040	.000
1540	179							040	.000	.017	.000
1600	149							047	.294	.000	.000
1620	173							054	.227	.000	.000
1640	040							040	B	.059	.000
1700	040							040	B	.000	.000
1720										.000	.000
1740										.000	.000
1800	172							109	.000	.000	.000
1820	126							119	.000	.072	.144
1840											.000
1900											.000
1920											.045
1940											.069
2000											.147
2020											.090
2040											.236
											.000

0900 OCT 9 JULY

TABLE A.5 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100												.279
2120												.000
2140												.000
2200												.368
2220												.483
2240												.335
2300												.342
2320												.291
2340												.115
0000												.247
0020												.000
0040												.000
0100												.000
0140												.000
0200	183			176-164					118	.185	.064	.000
0220	203			177-131					100	.583	.065	.000
0240	202			194-165					124	.474	.095	.000
0300	138								102	.333	.000	.000
0320												.000
0340	230			191-168					122	.250	.052	.104
0400	265			179-156					124	.440	.037	.000
0420	291			244-198					112	.453	.053	.000
0440	309			176-167					097	.344	.000	.000
0500	322								104	.321	.000	.000
0520	341			244-205					097	.078	.092	.000
0540	342			279-263					085	.043	.077	.000
0600	338			254-193					083	.129	.065	.000
0620	321			284-218					092	.336	.189	.080
0640	322			252-237					074	.214	.122	.000
0700	311			290-282					072	.000	.067	.000
0720	306			223-197					069	.000	.103	.000
0740				170-153								.000
0800												.000
0820												.000
0840	204								041	.000	.115	.050
	228								041	.000	.087	.000

TABLE A.6 KAUAI TO MIDWAY, STAR FISH

0900 GMT 9 JULY

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0900	040							040	B	.046	.000
0920	133							124	000	.109	.000
0940	175							055	.733	.033	.000
1000	157							055	.239	.077	.000
1020	160							051	.495	.050	.000
1040	185							131	000	.000	.000
1100	173							124	.102	.045	.089
1120	180							124	000	.026	.000
1140	163							104	.153	.044	.000
1200	159							100	000	.000	.000
1220	159							100	.051	.022	.000
1240	159							050	.283	.000	.000
1300	149							051	.149	.034	.000
1320	152							052	.263	.000	.000
1340	147							051	.065	.000	.000
1400	159							051	.000	.000	.000
1420								051	.000	.000	.000
1440								053	.263	.031	.000
1500	152							053	.235	.076	.000
1520	134							041	.333	.000	.159
1540	131							051	.176	.000	.000
1600	068							040	B	.000	.000
1620	040							053	000	.000	.000
1640								053	000	.000	.000
1700								051	.093	.000	.000
1720	141							054	.197	.000	.000
1740	160							053	000	.000	.000
1800	159							070	000	.000	.000
1820	192							051	000	.000	.000
1840	187							054	.000	.000	.000
1900	187							055	.000	.000	.000
1920	176							053	.000	.000	.000
1940	185							054	000	.000	.000
2000	185							051	000	.000	.000
2020	185							057	.078	.000	.000
2040	186							057	.011	.033	.033

TABLE A.6 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	183							052	.015	.000	.000
2120											.000
2140	040							040	B	.000	.039
2200	169							155	.000	.000	.000
2220	179							152	.333	.000	.000
2240											.000
2300											.000
2320	159							125	.000	.000	.000
2340	181							132	.143	.000	.000
0000	180							097	.398	.000	.000
0020	174							137	.000	.014	.042
0040	040							040	B	.017	.051
0100	155							137	.000	.011	.032
0120	160							147	.000	.063	.188
0140	164							140	.000	.171	.514
0200	146							131	.000	.120	.326
0220	193							131	.000	.105	.314
0240	214							078	.048	.105	.042
0300	219							079	.029	.026	.279
0320	237							120	.000	.129	.258
0340	238							122	.000	.161	.135
0400	241							078	.000	.191	.265
0420	234							086	.000	.000	.000
0440	236							077	.132	.000	.000
0500	221							074	.163	.009	.000
0520	220							073	.000	.027	.000
0540	196							065	.176	.000	.000
0600	197							059	.000	.000	.000
0620											.026
0640	160							040	.092	.017	.000
0700	160							040	.000	.022	.039
0720											.000
0740											.000
0800	159							040	.118	.051	.000
0820	142							040	.059	.203	.000
0840	157							040	.000	.000	.000

TABLE A.7 CANTON TO HAWAII, STAR FISH

0900 OCT 9 JULY

TIME	MOF	GAPS IN HF SPECTRUM				LOF	EVENT DAY	MGSD AVERAGE	SINGLE MGSD DAY
0900	190					040	000	.034	.068
0920	480					040	.011	.011	.000
0940	524					039	.012	.060	.082
1000	478					040	000	.000	.000
1020									.000
1040	304					043	.092	.051	.154
1100	318					043	.040	.011	.033
1120	349					044	.020	.000	.000
1140	300					045	000	.000	.000
1200	315					043	000	.000	.000
1220	284					043	.037	.011	.022
1240	290					042	000	.000	.000
1300	317					042	000	.120	.000
1320	319					042	000	.000	.000
1340	316					042	000	.000	.000
1400								.000	.000
1420	293					041	000	.230	.000
1440	301					042	000	.008	.000
1500	301					042	000	.000	.000
1520	288					041	.012	.037	.000
1540	272					041	000	.026	.000
1600	263					042	000	.000	.000
1620	258					041	000	.000	.000
1640	219					041	000	.028	.030
1700	198					040	000	.037	.042
1720	213					040	000	.000	.000
1740								.019	.000
1800	178					059	000	.012	.000
1820	176					067	000	.000	.000
1840	175					066	.083	.000	.000
1900	181					070	000	.000	.000
1920	185					067	000	.000	.000
1940	189					071	000	.047	.093
2000	196					066	.023	.000	.000
2020	223					065	000	.000	.000
2040	224					072	000	.016	.093

TABLE A.7 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	236							075	000	.008	.000
2120	224							070	000	.000	.000
2140	222							076	000	.000	.000
2200	206							084	000	.000	.000
2220	220							087	000	.000	.000
2240	233							072	000	.000	.000
2300	215							073	000	.000	.000
2320	216							084	000	.000	.000
2340											
0000	221							058	000	.000	.000
0020											
0040											
0100	230							060	000	.000	.000
0120	222							060	000	.003	.000
0140	215							070	000	.009	.000
0200	204							067	000	.000	.000
0220	216							062	000	.000	.000
0240	229							063	000	.005	.010
0300	250							054	000	.000	.000
0320	276							053	000	.000	.000
0340											
0400											
0420	326							045	000	.000	.000
0440	322							042	000	.000	.000
0500	310							042	.011	.000	.000
0520	278							053	000	.000	.000
0540	295							041	000	.000	.000
0600	289							039	000	.000	.000
0620	277							041	000	.000	.000
0640	264							040	000	.000	.000
0700	228							040	000	.023	.000
0720	230							040	000	.020	.000
0740	233							040	000	.047	.000
0800	237							040	000	.022	.000
0820	310							040	000	.015	.000
0840	353							040	000	.000	.000

TABLE A.8 CANTON TO WAKE, STAR FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0900	040	385-359 289-280	13E-132	096-091 114-109	121-080 063-061 064-060 066-061	060-057 062-059		040	B	.000	.000
0920	640							040	000	.040	.000
0940	281							040	000	.000	.009
1000	398							040	.101	.000	.000
1020	078	13E-132	096-091 114-109	121-080 063-061 064-060 066-061	060-057 062-059			040	000	.000	.007
1040	079							040	000	.000	.013
1100	238							046	.026	.223	.017
1120	237							045	.182	.034	.000
1140	221							040	.011	.000	.000
1200	209							044	.024	.006	.000
1220	215							047	.030	.070	.000
1240	182							040	.021	.012	.000
1300	222							040	000	.000	.000
1320	238							040	000	.000	.000
1340	232	13E-132	096-091 114-109	121-080 063-061 064-060 066-061	060-057 062-059			040	000	.000	.030
1360	233							040	000	.015	.030
1380	210							040	000	.000	.231
1400	195							040	000	.053	.030
1420	174							040	000	.086	.023
1440	174							040	000	.128	.233
1460	177							040	000	.055	.163
1480	180							040	000	.017	.000
1500	186							040	000	.000	.000
1520	193							040	000	.046	.000
1540	160	13E-132	096-091 114-109	121-080 063-061 064-060 066-061	060-057 062-059			040	000	.091	.000
1560	142							040	000	.016	.000
1580	156							041	000	.052	.000
1600	208							045	018	.104	.149
1620								046	000	.049	.000
1640									000	.020	.027
1660	223							069	000	.038	.000
1680	238							063	000	.000	.013
1700	236							073	000	.000	.000
1720	222							081	000	.033	.036
1740	203	13E-132	096-091 114-109	121-080 063-061 064-060 066-061	060-057 062-059			111	000	.133	.000
1760	205							111	000	.010	.000
1780								111	000		

TABLE A.8 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	192							111	000	.000	.056
2120											.000
2140	197							111	000	.032	.000
2200	203							112	000	.000	.000
2220											.135
2240	208							091	000	.185	.000
2300	203							078	000	.031	.084
2320	203							082	000	.000	.000
2340	210							083	000	.000	.000
0000											.000
0020											.000
0040											.000
0100											.121
0120	157							083	000	.000	.000
0140	195							077	000	.000	.000
0200	216							077	000	.000	.000
0220	202							076	000	.000	.000
0240	200							077	000	.000	.000
0300											.000
0320	204							081	000	.000	.000
0340	216							077	000	.039	.000
0400	232							077	000	.008	.000
0420	241							083	000	.031	.000
0440	245							082	000	.005	.000
0500	250							077	000	.006	.000
0520	250							083	000	.033	.000
0540	263							071	000	.069	.000
0600	268							072	000	.089	.000
0620	269							068	000	.075	.000
0640	264							052	000	.078	.000
0700	253							051	000	.143	.000
0720	255							046	000	.000	.000
0740	279							046	000	.000	.000
0800	267							045	000	.000	.000
0820	288							045	000	.040	.000
0840	315							040	000	.079	.000

TABLE A.9 CANTON TO VITI LEVU, STAR FISH

0900 GMT 9 JULY

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0900	619	576-560	250-191					214	000	.021	.023
0920	640							055	000	.084	.073
0940	598							040	000	.063	.022
1000	642							040	000	.102	.097
1020	512	063-061						040	.311	.078	.114
1040	592							040	.033	.149	.104
1100	556							040	.004	.059	.072
1120	606							040	000	.146	.210
1140	063	063-059						041	000	.079	.158
1200											.000
1220	632							041	.012	.059	.015
1240	623							041	.005	.087	.052
1300	525	080-076						041	.017	.087	.018
1320											.032
1340	554							042	000	.021	.043
1400											.000
1420	533	050-048						040	000	.043	.000
1440	455							041	000	.080	.045
1500	507							041	.015	.099	.100
1520	478							041	.018	.158	.098
1540	435	082-079 072-070						041	000	.014	.000
1600	356							041	.025	.036	.071
1620	269							041	.026	.182	.289
1640	350							040	000	.235	.340
1700	429	061-058 054-051						040	000	.116	.221
1720	429							040	.026	.107	.214
1740											.000
1800	402							047	.023	.053	.063
1820	494	071-069						061	000	.000	.000
1840	551							060	.006	.161	.270
1900											.064
1920	427							081	000	.120	.000
1940	481							054	.005	.119	.000
2000	454							056	000	.254	.000
2020											.000
2040											.000

TABLE A.9 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	397							055	000	.000	.000
2120										.000	.000
2140	247							071	000	.000	.000
2200										.000	.000
2220	228							082	000	.000	.000
2240	266							086	000	.000	.000
2300	269							081	000	.000	.000
2320	291							071	.036	.000	.000
2340	309							082	000	.000	.000
0000										.000	.000
0020										.000	.000
0040	363							044	000	.000	.000
0100	335							061	000	.000	.000
0120										.000	.000
0140	293							057	000	.020	.000
0200	240							057	000	.000	.000
0220										.000	.000
0240	239							059	000	.000	.000
0300	281							064	.028	.000	.000
0320	275							057	000	.000	.000
0340	305							056	000	.000	.000
0400										.000	.000
0420	398							048	.017	.000	.000
0440	154							044	000	.000	.000
0500	451							052	000	.000	.000
0520	379							041	000	.000	.000
0540	264							041	000	.010	.000
0600	243							041	.045	.000	.000
0620										.000	.000
0640										.000	.000
0700										.000	.000
0720	367							041	.055	.069	.011
0740										.000	.066
0800	407							041	000	.000	.131
0820	357							041	000	.000	.000
0840	291							041	000	.039	.078

TABLE A.10 CANTON TO TUTUILA, STAR FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
		379-335	375-311	159-155 175-153 164-154	129-116 226-119 173-125	094-090 097-091 095-090					
0900	618							040	.076	.327	.278
0920	625							040	.000	.160	.140
0940	625							040	.000	.198	.323
1000	547							040	.000	.209	.000
1020											
1040	413							040	.000	.402	.473
1100	481							041	.020	.225	.466
1120	513							041	.000	.312	.225
1140	476							040	.018	.193	.312
1200	540							040	.014	.048	.193
1220	482							041	.000	.389	.048
1240	458							040	.000	.025	.389
1300	469							040	.000	.154	.000
1320	501							039	.000	.158	.308
1340	513							040	.000	.062	.047
1400											.000
1420	346							041	.026	.159	.000
1440	322							041	.000	.226	.127
1500	445							040	.077	.375	.367
1520	353							041	.000	.249	.343
1540	290							041	.024	.162	.170
1600	365							041	.015	.055	.173
1620	358							041	.000	.099	.055
1640	432							040	.163	.095	.000
1700	333							040	.000	.012	.095
1720											.025
1740	324							053	.048	.041	.051
1800	347							041	.350	.041	.082
1820	222							041	.265	.033	.041
1840	273							042	.017	.009	.000
1900	203							046	.140	.000	.018
1920	267							040	.000	.140	.000
1940	181							040	.071	.025	.280
2000	370							040	.000	.012	.000
2020	255							040	.000	.000	.024
2040	308							041	.000	.000	.000

0900 GMT 9 JULY

TABLE A.10 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	311							040	000	.014	.029
2120	247							040	000	.000	.000
2140	473							040	.132	.000	.000
2200	248							040	000	.000	.000
2220	240							040	.053	.042	.000
2240	236							040	.168		.000
2300											.000
2320	274							040	000	.109	.000
2340	274							040	000	.105	.000
0000											.000
0020	289							040	000	.227	.000
0040	281							040	000		.000
0100	293							040	000	.242	.000
0120	339					189-181		040	.032	.117	.000
0140	302							040	000	.071	.077
0200	324							040	000	.070	.140
0220	320							040	000	.037	.074
0240											.062
0300	277							040	000	.000	.000
0320	291							040	000	.049	.000
0340	311							040	000	.000	.000
0400	327							040	000	.022	.000
0420	330							040	000	.000	.000
0440	321							040	000	.000	.000
0500	359							040	000	.000	.000
0520	287							040	000	.000	.000
0540	279							040	000	.000	.000
0600	309							040	.033	.000	.000
0620	319							040	.097	.079	.093
0640	302							040	.165	.090	.090
0700								040	.149	.022	.000
0720	311										.000
0740	457							040	000	.126	.069
0800	384							040	.161	.180	.316
0820	475							040	.172	.497	.000
0840	481							040	.207	.000	.000
								040	.227	.272	.278

TABLE A.11 CANTON TO RAROTONGA, STAR FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
		410-394	249-191	327-313	140-131						
0900	186							111	000	.021	.000
0920	532							041	000	.038	.000
0940	444							041	.040	.048	.040
1000											.054
1020	259							067	.839	.043	.044
1040											.034
1100	415							040	.021	.043	.027
1120	433							040	.013	.029	.019
1140	426							041	000	.070	.069
1200	344							040	.046	.058	.043
1220	307							041	000	.057	.014
1240	302							041	000	.007	.022
1300	308							040	000	.043	.056
1320	320							042	000	.013	.040
1340	301							043	.062	.074	.020
1400											.034
1420	286							045	.029	.119	.140
1440	212							040	.035	.157	.246
1500	193							040	.033	.120	.148
1520	214							041	020	.053	.080
1540	186							040	.034	.078	.134
1600											.060
1620	135							041	.032	.156	.000
1640	125							042	000	.134	.000
1700	118							040	.026	.331	.626
1720	103							043	.033	.205	.301
1740											.266
1800											.346
1820	199							046	.516	.057	.000
1840											.043
1900											.188
1920											.181
1940	239							070	.024	.099	.000
2000											.036
2020											.000
2040											.000

0900 GMT 9 JULY

TABLE A.11 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100											.000
2120											.014
2140											.000
2200											.000
2220											.022
2240											.074
2300	222										.026
2320	217										.000
2340	210										.000
0000	204										.039
0020											.000
0040											.000
0100	220										.000
0120	258										.000
0140	279										.000
0200	307										.000
0220	365										.038
0240											.000
0300	383										.000
0320	331										.000
0340	280										.003
0400	292										.003
0420	283										.003
0440	291										.003
0500	284										.003
0520	289										.003
0540											.003
0600	270										.003
0620	241										.003
0640											.003
0700											.003
0720	226										.046
0740	228										.077
0800	194										.036
0820	185										.052
0840	211										.158
											.149
											.036
											.077
											.036
											.052
											.158
											.149

TABLE A.12 ROL-NAMUR TO TUTUILA, STAR FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	0900 GMT 9 JULY	
											SINGLE BKGD DAY	
0900	252	245-236	096-092					193	.153	.066	.052	
0920	513							040	.000	.000	.000	
0940	354							041	.000	.019	.038	
1000	249							040	.019	.030	.000	
1020	415	396-376 375-355	096-091	122-116				040	.000	.047	.079	
1040	472							040	.046	.010	.010	
1100	459							041	.060	.203	.000	
1140								040	.023	.005	.000	
1200	301	160-153						040	.000	.245	.018	
1220	302							040	.019	.123	.038	
1240	402							040	.006	.075	.040	
1300	389							042	.000	.037	.000	
1320	392	182-172	097-092	062-060				041	.000	.024	.000	
1340	400										.035	
1400	322							041	.028	.063	.000	
1420	275							041	.073	.062	.131	
1440	233	155-146 157-153	106-101	063-060				041	.047	.077	.124	
1500	227							041	.102	.011	.000	
1520	211							041	.076	.027	.026	
1540	215							041	.000	.105	.000	
1600	158	073-070	123-117	072-079				041	.026	.027	.000	
1620	196							040	.000	.000	.000	
1640	189							040	.000	.000	.000	
1700	151							040	.000	.059	.000	
1720		078-068						040	.000		.071	
1740											.000	
1800	159							074	.000	.121	.169	
1820											.010	
1840								058	.000	.005	.000	
1900	225							054	.048	.000	.000	
1920	261							055	.000	.000	.000	
1940	239							063	.000	.009	.015	
2000	260							066	.000	.000	.000	
2020	270							071	.000	.030	.000	
2040	313											

TABLE A.12 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	316							072	000	.000	.000
2120	311							076	000	.008	.015
2140	305							075	000	.003	.000
2200	319							065	.055	.005	.016
2220	305							078	000	.000	.000
2240	266							088	000	.000	.000
2300											.038
2320	265							082	000	.009	.018
2340	281							082	000	.000	.000
0000											.000
0020	297							082	000	.020	.000
0040	289							074	000	.025	.000
0100	300							070	000	.006	.000
0120	300							073	000	.000	.000
0140	290							075	000	.000	.000
0200	286							075	000	.000	.000
0220	282							077	000	.196	.392
0240										.016	.017
0300	296							071	000	.000	.000
0320	301							072	000	.000	.000
0340	313							073	000	.025	.000
0400	322					142-138		064	.016	.003	.000
0420	353							067	.045	.005	.000
0440	343							063	000	.000	.000
0500	353							063	000	.005	.000
0520	325							081	000	.000	.000
0540	307							063	000	.000	.000
0600	294							054	000	.000	.000
0620	302							055	.213	.000	.000
0640	307							040	000	.000	.000
0700										.013	.000
0720											.000
0740	400							040	000	.010	.029
0800	480							040	000	.052	.064
0820	480							040	000	.096	.096
0840	489							040	000	.067	.117

TABLE A13 ROL-NAMUR TO VITI LEVU, STAR FISH

0900 GMT 9 JULY

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0900	258	247-239	214-153	123-121	105-103	088-085	087-084	073-069	225	000	.071	.093
0920	255	239-231	216-146						048	.032	.065	.058
0940	319	244-232							041	.054	.051	.051
1000	279								041	.290	.101	.101
1020	272								040	.435	.181	.130
1040	202								040	.562	.217	.179
1100	179								040	.396	.148	.103
1120												
1140	341			142-114	101-093	081-079	073-068	063-058	041	.160	.159	.160
1200												
1220	324	200-192	185-172	158-110	100-097	092-085	082-074	071-070	063	.287	.153	.109
1240	315			155-114	098-096		083-059		043	.221	.245	.139
1300	262	200-192			161-109	099-097	089-087	083-078	056	.359	.208	.257
1320	302								041	.000	.223	.221
1340	286				076-071	064-060		051-048	042	.049	.223	.295
1400												.333
1420												.156
1440	306	242-228	153-149	123-116				049-047	041	.023	.269	.165
1500	252		176-154	162-140	122-116	100-094	080-077	052-049	041	.218	.146	.419
1520	198		165-180	122-116	100-094	073-070		063-059	041	.331	.077	.159
1540	140			121-115	079-076			052-048	044	.198	.247	.098
1600	195		167-149					051-048	041	.195	.101	.000
1620												.070
1640	279	205-198	171-156	122-117	072-070			051-049	041	.038	.210	.123
1700	238				082-078				040	.106	.119	.235
1720	198				082-078				040	.057	.149	.167
1740												.120
1800	089				080-077				040	.061	.167	.137
1820	109				081-078				040	.043	.106	.157
1840	152				079-077		060-057		053	.051	.141	.080
1900	200				079-077	079-069	064-062		065	.074	.254	.147
1920	235					071-069			055	.033	.160	.331
1940	237								061	.000	.131	.279
2000	236								068	.000	.198	.131
2020	261								073	.000	.181	.198
2040												.142

TABLE A.13 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	DKGD AVERAGE	SINGLE DKGD DAY
2100	268							085	000	.049	.142
2120											.049
2140	279							084	000	.030	.042
2200											.047
2220											.000
2240	263							103	000	.000	.000
2300	244							084	000	.008	.000
2320	292							082	000		.000
2340	253							085	000		.000
0000	255							094	000		.000
0020											.000
0040	310							084	000	.006	.000
0100	297							082	000	.010	.000
0120											.008
0140	343							077	000	.016	.016
0200	309							082	000	.000	.000
0220											.000
0240	283							083	000	.000	.000
0300	267							082	000	.000	.000
0320	292							084	000	.004	.000
0340	354							081	088	.007	.014
0400		324-300									.009
0420	387							076	.006	.000	.000
0440	317							082	.000	.000	.000
0500	310							079	.000	.000	.000
0520	320							076	.000	.012	.012
0540	302							082	.055	.041	.041
0600	281							086	.000	.013	.026
0620											.000
0640											.000
0700	273							042	.000	.088	.000
0720											.000
0740											.000
0800	251							041	.071	.122	.167
0820	267							041	.119	.088	.164
0840	264							041	.000	.099	.072
											.165

TABLE A.14 ROI-NAMUR TO RAROTONGA, STAR FISH

0900 GMT 9 JULY											
TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0900	040							040	B	.015	.000
0920	319							041	000	.175	.000
0940	233							041	000	.138	.000
1000											.000
1020	197						119-115	097-087			.000
1040										.173	.177
1100	205						103-095	063-061		.244	.077
1120	273						096-091	063-060		.170	.174
1140	248						122-118			.160	.160
1200	230						116-112	063-061		.075	.068
1220	193									.137	.206
1240	210									.038	.000
1300	209									.011	.000
1320	226									.066	.000
1340	201									.036	.000
1400							115-073	063-057			.000
1420	198									.186	.167
1440	160						104-095	084-079		.115	.146
1500	116						101-093	062-060		.198	.109
1520	115							064-058		.053	.053
1540	134									.030	.025
1600										.413	.043
1620	139						078-071	064-058		.413	.043
1640	136									.075	.019
1700	127						080-078	063-060		.328	.617
1720	104						080-078	072-070		.024	.048
1740	117						080-078			.264	.000
1800										.071	.000
1820	080									.357	.000
1840										.000	.000
1900										.000	.000
1920										.044	.000
1940										.000	.000
2000	223									.066	.000
2020										.000	.000
2040										.000	.000

TABLE A.14 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100											.000
2120											.000
2140											.090
2200											.000
2220											.069
2240											.000
2300	219							137			.000
2320	242			209-186				149	.524	.000	.000
2340	230			206-147				127	.573	.000	.000
0000	263							204	.000	.000	.000
0020											.000
0040											.000
0100											.000
0120	299							119			.130
0140	244			199-155				133	.294	.083	.083
0200	249			185-158				125	.297	.068	.068
0220	259			182-156				129	.282	.053	.053
0240									.000	.321	.257
0300	282							153	.000	.259	.071
0320	280							135	.000		.259
0340	278			182-158				117	.149		.000
0400	289							124	.000		.000
0420	283			181-135				117	.277		.000
0440	271							116	.000		.000
0500											.000
0520	247							089	.038	.000	.000
0540											.000
0600	271			174-150				064	.208	.000	.000
0620	263							063	.000	.000	.000
0640											.000
0700											.000
0720	247										.000
0740	251							053	.000	.192	.000
0800	235			169-146				056	.323	.167	.000
0820	236							052	.000	.091	.000
0840	253			218-189				056	.000	.243	.000
								053	.195	.262	.000

TABLE A.15 ROI-NAMUR TO MIDWAY, STAR FISH

0900 GRT 9 JULY

TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY	BAKED AVERAGE	SINGLE BKGD DAY
0900	229						040	000	.000	.000
0920	157						047	000	.000	.000
0940	110						041	.029	.023	.005
1000	095						041	.037	.018	.054
1020	115						040	.040	.056	.167
1040	113						041	.000	.044	.133
1100	106						041	.031	.000	.000
1120	111						040	000	.000	.000
1140										
1200	147						040	.019	.000	.091
1220	153						040	.018	.068	.000
1240	172						080	000	.000	.068
1300	165						040	.024	.036	.000
1320	149						040	.028	.053	.073
1340	133						040	000	.137	.158
1400										.000
1420	135						041	.050	.209	.000
1440	560						042	000	.000	.000
1500	158						041	000	.000	.000
1520	158						042	000	.043	.000
1540	169						041	.047	.034	.000
1600	195						041	000	.040	.000
1620	196						040	.019	.074	.038
1640	201						040	.031	.133	.000
1700	195						040	000	.000	.000
1720	160						040	000	.000	.000
1740	139						040	000	.000	.000
1800	134						040	.081	.000	.000
1820	131						040	.106	.000	.000
1840	151						050	.074	.000	.000
1900	160						073	.154	.000	.000
1920	199						074	.233	.000	.000
1940	199						056	.063	.000	.000
2000	229						061	.036	.000	.000
2020	252						071	.051	.000	.000
2040	256						072	.022	.020	.040
							073	.033	.008	.023

TABLE A.15 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	237							106	000	.012	.035
2120	180							135	.089	.007	.000
2140	159							106	000	.000	.000
2200	173							103	000	.000	.000
2220	167							111	000	.000	.000
2240											
2300	152							122	000	.000	.000
2320	144							113	000	.000	.000
2340	154							113	000	.015	.000
0000	185							125	.083	.000	.000
0020	159							125	000	.000	.000
0040	218							138	000	.000	.000
0100	207							123	.083	.006	.000
0120	217							137	000	.012	.000
0140	164							131	000	.020	.000
0200	226							117	.183	.011	.033
0240	230							116	.140	.020	.000
0300	239							080	000	.020	.000
0320	258							107	000	.000	.000
0340	250							073	000	.017	.000
0400	268							082	000	.020	.020
0420	256							086	.029	.006	.000
0440	275							114	000	.000	.000
0500	272							080	000	.005	.016
0520	265							088	000	.000	.000
0540	264							097	000	.000	.000
0600	265							086	000	.000	.000
0620											
0640	249							079	.047	.000	.000
0700	219							080	000	.000	.000
0720											
0740											
0800	241							041	000	.000	.000
0820	251							040	000	.000	.000
0840	249							040	000	.000	.000

TABLE A.16 KAUAI TO TUTUILA, STAR FISH

0900 GMT 9 JULY

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0900	345	260-228	208-193		105-089	097-087		050	.214	.070	.194
0920	318	234-226	177-145		107-101			041	.202	.052	.000
0940											.103
1000											.000
1020											.052
1040	152			124-113	096-090			040	.054	.000	.000
1100	127			125-116	099-085			040	.287	.000	.000
1120	151				107-092	078-076		042	.239	.134	.120
1140											.000
1200											.066
1220											.246
1240											.192
1300											.092
1320											.143
1340											.102
1400											.065
1420	151			127-119	102-092			041	.164	.046	.050
1440	133			124-119	112-101	082-079		041	.207	.125	.125
1500	187		159-152	132-128	122-117	097-091		041	.151	.179	.124
1520	152			121-117	105-090			041	.171	.040	.000
1540	157			125-117	109-088			041	.250	.063	.000
1600	151				122-075			041	.427	.000	.000
1620	040							040	B	.056	.000
1640	068							063	B	.166	.230
1700	040							040	B	.064	.193
1720	136							117	.000	.113	.121
1740									.000		.015
1800	233							099	.000	.178	.074
1820											.000
1840	184							113	.169	.214	.035
1900	186		145-133	142-132	109-098			083	.330	.111	.058
1920			170-157								.000
1940											.000
2000	147							098	.000	.066	.000
2020	164					086-080		078	.128	.080	.114
2040	160							097	.000	.027	.058
											.023

TABLE A.16 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	161							096	000	.074	.592
2120	160							098	.081	.033	.062
2140	158							101	.070	.133	.056
2200	200							115	.000	.173	.290
2220	201							103	.000		.000
2240								100	.277		.000
2300	174							099	.000	.035	.101
2320											.000
2340	173							093	.000	.088	.000
0000	166							090	.000	.100	.000
0020	217							073	.028	.137	.133
0040	209							067	.000	.089	.071
0100	216							070	.000	.054	.019
0120	222							073	.000	.042	.023
0140	245							063	.000	.057	.000
0200	260							073	.385	.106	.089
0220											.045
0240								062	.000	.061	.031
0300	230							062	.125	.041	.000
0320	222							053	.056	.000	.000
0340	266							063	.148	.046	.000
0400	266							068	.399	.038	.000
0420											.000
0440								053	.095	.046	.000
0500	296							040	.058	.011	.023
0520	297							040	.057	.083	.040
0540	304							040	.063	.000	.000
0600	295							040	.181	.121	.121
0620	294							040	.160	.184	.058
0640	303										.000
0700								040	.348	.098	.000
0720	296							040	.172	.118	.068
0740	249							040	.216	.339	.000
0800	234								.100	.106	.260
0820											.000
0840	271										.000

TABLE A.17 ROI-NAMUR TO PALO ALTO, STAR FISH

0900 GMT 9 JULY

TIME	MOF	GAPS IN HF SPECTRUM				LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0900	146					053	.043	.134	.142
0920	075					041	000	.013	.000
0940									.000
1000									.065
1020									.000
1040	076					040	000	.096	.000
1100	066					042	000	.097	.197
1120	077					044	000	.016	.000
1200	209					042	.395	.126	.262
1220	223					043	.372	.114	.053
1240	211					042	.343	.069	.086
1300	132					042	.100	.091	.111
1320	091					044	.106	.000	.000
1340	098					041	000	.000	.000
1400	124					041	000	.009	.000
1420	129					042	000	.011	.000
1440	125					049	000	.008	.000
1500									.000
1520	131					061	000	.000	.000
1540									.000
1600	134					084	000	.000	.000
1620									.000
1640									.000
1700									.000
1720									.000
1740									.000
1800									.000
1820									.000
1840	132					122	000	.000	.000
1900	193					129	000	.000	.000
1920	156					141	000	.000	.000
1940	193					126	000	.000	.000
2000									.000
2020									.000
2040									.000

TABLE A.17 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	237	201-159						149	.477	.195	.000
2120											.000
2140											.000
2200											.000
2220											.000
2240											.000
2300	237	144-134						040	B	.000	.000
2320											.000
2340											.000
0000											.000
0020											.000
0040											.000
0100											.000
0120											.000
0140											.000
0200											.000
0220	239	165-130						218	000	.000	.028
0240											.000
0300											.000
0320											.011
0340											.000
0400											.000
0420											.000
0440											.016
0500											.016
0520											.000
0540	237							103	000	.000	.000
0560											.000
0600											.000
0620											.000
0640											.000
0700											.000
0720											.000
0740											.041
0800											.000
0820											.000
0840	176							048	000	.000	.000
0900											.000
0920											.000
0940											.000
1000											.000
1020											.000
1040											.000
1060											.000
1080											.000
1100											.000

TABLE A.18 OKINAWA TO HAWAII, STAR FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	0900 GMT 9 JULY	
											BKGD	SINGLE
0900												DAY
0920												
0940												
1000												
1020	040							040	B	.000	.000	.000
1040	182							083	000	.000	.000	.000
1100	144							104	000	.000	.000	.000
1120												
1140	130							074	.536	.192	.000	.000
1200												
1220												
1240												
1300												
1320												
1340												
1400												
1420												
1440												
1500	040							040	B	.224	.250	.250
1520	117							073	.391	.120	.273	.273
1540												
1600	071							052	000	.132	.076	.076
1620												
1640	110							054	.125	.095	.111	.111
1700	136							054	.183	.104	.048	.048
1720	154							082	000	.140	.000	.000
1740												
1800	128							101	.296	.144	.107	.107
1820	113							083	000	.110	.197	.197
1840	110							080	.300	.104	.141	.141
1900	105							092	000	.000	.104	.104
1920												
1940												
2000	150							083	000	.102	.019	.019
2020	154							084	.086	.000	.000	.000
2040												

TABLE A.18 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	182							115	000	.000	.000
2120	194							105	000	.000	.000
2140	195							104	000	.000	.000
2200	179							119	000	.000	.000
2220	220							156	000	.000	.000
2240	221							145	.053	.000	.000
2300				153-149							.244
2320											.275
2340											.267
0000											.208
0020											.000
0040											.137
0100											.044
0120	175			148-142				126	.122	.144	.144
0140	189							131	000	.054	.108
0200	216			192-184				097	.118	.159	.318
0220	242							120	000	.152	.152
0240	246			205-183				096	.240	.050	.100
0300								164	000	.000	.000
0320	239			196-189				126	.257	.008	.000
0340	270			202-186				153	.137	.000	.000
0400	278			202-186				121	.102	.034	.068
0420	234			194-186				149	.188	.131	.161
0440	262			174-147				143	.227	.045	.000
0500	270		225-217	197-186				166	.106	.000	.000
0520	262			169-154				127	.163	.000	.000
0540	271			160-155				115	.083	.000	.000
0600	277							163	.000	.000	.000
0620	240			158-156				123	.103	.000	.000
0640	222			159-145				121	.356	.258	.209
0700	214		210-193	160-150				121	.108	.312	.000
0720	221			161-155				100	.050	.144	.000
0740	223							097	.000	.250	.420
0800	217							083	.045	.108	.000
0820	220							088	.033	.126	.000
0840	234							081	.039	.000	.000

TABLE A.19 CANTON TO PALO ALTO, STAR FISH

TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY	BKGD AVERAGE	0900 OCT 9 JUL7	
										SINGLE BKGD DAY	DAY
0900	219						042	000	.000	.000	.000
0920	181						043	000	.035	.069	.069
0940	077						051	000	.096	.144	.144
1000	077						046	000	.044	.131	.131
1020										.197	.197
1040	040						040	B	.097	.362	.362
1100										.192	.192
1120	200						042	.487	.091	.182	.182
1140	190						040	.600	.045	.090	.090
1200	077						043	.235	.037	.037	.037
1220	110						041	.058	.055	.000	.000
1300	207						041	.380	.007	.021	.021
1320	202						039	.331	.000	.000	.000
1340	188						041	.143	.000	.000	.000
1400	191						044	.136	.040	.119	.119
1420	161						047	000	.000	.000	.000
1440										.208	.208
1500	160						065	000	.000	.000	.000
1520	134						071	.032	.078	.233	.233
1540	040						040	B	.234	.701	.701
1600										.001	.001
1620	130						071	.237	.000	.000	.000
1640	202						117	000	.000	.000	.000
1700	205						117	000	.000	.000	.000
1720	220						161	000	.000	.000	.000
1740	210						143	000	.000	.000	.000
1800							121	000	.000	.000	.000
1820	173						143	000	.000	.000	.000
1840	189						123	000	.000	.000	.000
1900	194						123	000	.032	.096	.096
1920	196						123	000	.100	.299	.299
1940										.000	.000
2000										.316	.316
2020										.341	.341
2040										.474	.474

TABLE A.19 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100												.000
2120												.000
2140												.143
2200												.173
2220												.000
2240												.000
2300												.116
2320												.149
2340												.000
0000												.233
0020	294	279-239						139	.258		.083	.166
0040	305	263-236						107	.136		.135	.403
0100	301	270-230						117	.288		.093	.186
0120	312					180-167		131	.000		.000	.000
0140	239							096	.000		.000	.000
0200												.000
0220	264							100	.000		.000	.000
0240	275							100	.000		.000	.000
0300	287					139-132		098	.037		.000	.000
0320												.000
0340	206							094	.000		.008	.000
0400	250							100	.000		.000	.000
0420	212											.000
0440	236							097	.000		.011	.000
0500	233							092	.000		.000	.000
0520	253							070	.000		.000	.000
0540	222							056	.000		.020	.040
0600	215							046	.000		.000	.000
0620	152							040	.000		.000	.000
0640	190							040	.000		.000	.000
0700	186							040	.000		.000	.000
0720	155							040	.000		.000	.000
0740	190							040	.000		.000	.000
0800	198							040	.000		.000	.000
0820	201							040	.000		.000	.000
0840								040	.000		.000	.000

TABLE A.20 KAUAI TO FAIRBANKS, STAR FISH

0900 GMT 9 JULY

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0900	158							040	000	.000	.000
0920	117							054	000	.000	.000
0940	125							055	000	.000	.000
1000	145							045	000	.000	.000
1020	159							041	000	.000	.000
1040	159							040	000	.000	.000
1100	161							041	000	.000	.000
1120	146							042	.042	.000	.000
1140	122							043	.067	.000	.000
1200	120							042	000	.073	.000
1220	131							041	000	.000	.000
1240	110							041	.101	.000	.000
1300	098							040	000	.000	.000
1320	099							041	000	.000	.000
1340	093							040	000	.000	.000
1400	091							050	000	.022	.044
1420	100							046	000	.043	.086
1440	088							045	000	.000	.000
1500	097							052	000	.000	.000
1520	083							063	000	.000	.000
1540	158							072	000	.000	.000
1600	133							105	000	.000	.000
1620											
1640											
1700	172							092	.150	.000	.000
1720	153					125-113		123	000	.000	.000
1740	106							094	000	.000	.000
1800	154							082	.194	.000	.000
1820	133					137-123		098	000	.000	.000
1840											
1900	151							094	000	.000	.000
1920											
1940	153							101	000	.000	.000
2000	127							095	000	.000	.000
2020	160							122	000	.000	.000
2040											

TABLE A.20 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100												.000
2120												.000
2140												.000
2200	145								116	000	.000	.000
2220	165								126	000	.000	.000
2240												.000
2300	160								125	000	.000	.000
2320												.000
2340												.000
0000												.000
0020												.000
0040												.000
0100	150								123	000	.000	.000
0120												.000
0140												.000
0200												.000
0220	176								131	000	.000	.000
0240												.000
0300												.056
0320												.000
0340												.000
0400	172								122	000	.000	.000
0420	159								128	000	.000	.000
0440	185								133	000	.000	.000
0500	158								126	000	.000	.000
0520												.000
0540												.000
0600												.000
0620												.000
0640	185								041	000	.013	.027
0700	158								041	000	.009	.018
0720	178								040	000	.013	.026
0740	191								041	000	.026	.053
0800	189								040	000	.000	.000
0820	182								041	000	.000	.000
0840	157								040	000	.000	.000

TABLE A.21 KAUAI TO RAROTONGA, STAR FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	0900 GMT 9 JULY	
											SINGLE BKGD DAY	
0900	040					135-125	110-076	040	B	.242	.078	
0920	153							052	.436	.205	.071	
0940											.128	
1000											.115	
1020											.135	
1040											.162	
1100	133					125-075	073-068	065	.809	.258	.000	
1120											.000	
1140											.000	
1200											.142	
1220											.000	
1240											.000	
1300											.000	
1320											.024	
1340											.020	
1400											.037	
1420											.065	
1440											.059	
1500											.117	
1520	131										.040	
1540	112							041	.400	.256	.075	
1600						126-117	108-085 107-087	041	.338	.386	.000	
1620											.164	
1640	070							047	.217	.231	.000	
1700	112						109-101	076	.611	.340	.340	
1720											.703	
1740											.001	
1800											.000	
1820											.000	
1840											.000	
1900											.623	
1920											.532	
1940											.001	
2000											.000	
2020											.692	
2040											.001	
											.531	

TABLE A.21 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100											.001
2120											.717
2140											.577
2200											.244
2220											.150
2240											.306
2300											.000
2320	159			153-133				124	.571	.525	.551
2340	161			151-138				150	.000		.001
0000	156					126-106		104	.635	.001	.000
0020											.000
0040											.000
0100	157										.000
0120	181							121	.000		.000
0140	220							134	.000		.000
0200	177			148-142				132	.068	.726	.000
0220	179			161-142				133	.432	.464	.000
0240				149-143				132	.128		.000
0300	321			272-189							.000
0320	188			155-142	133-119			182	.597	.679	.000
0340	191							117	.380	.699	.000
0400	141							156	.000		.000
0420								132	.000		.000
0440	282		269-193								.000
0500	162			140-130	119-112	117-081		063	.511	.486	.000
0520	249					087-080		054	.222	.676	.000
0540						174-081		041	.447	.885	.000
0600	173										.000
0620	131					093-086		042	.000		.000
0640								041	.078		.000
0700											.000
0720	310		304-277		143-131	119-112	091-081				.000
0740	182			262-168				042	.560		.000
0800	148					099-090		041	.000		.000
0820	186					098-081		041	.084	.354	.000
0840	142					097-091		042	.118	.167	.000
								041	.059	.252	.000

TABLE A.22 ROI-NAMUR TO WAKE, STAR FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	0900 GMT 9 JULY	
											SINGLE BKGD DAY	DAY
0900	139							040	000	.066	.000	.000
0920	108							042	000	.060	.000	.000
0940	094							040	000	.182	.234	.234
1000	092							040	000	.122	.237	.237
1020	095							041	000	.083	.127	.127
1040	089							045	000	.009	.000	.000
1100	083							042	000	.017	.000	.000
1120	139							040	.051	.000	.000	.000
1140	132							040	.054	.014	.000	.000
1200	130							040	.012	.012	.024	.024
1220	139							040	.051	.000	.000	.000
1240	120							040	.000	.000	.000	.000
1300	211							040	.000	.000	.000	.000
1320	116							040	.000	.000	.000	.000
1340	197							040	.000	.024	.049	.049
1400	114							040	.057	.077	.230	.230
1420	110							040	.086	.071	.177	.177
1440	121							040	.000	.231	.385	.385
1500	106							040	.000	.109	.328	.328
1520	141							040	.188	.029	.000	.000
1540	160							040	.000	.000	.000	.000
1600	186							040	.000	.127	.000	.000
1620	236							040	.000	.035	.000	.000
1640	166							040	.000	.180	.000	.000
1700	151							040	.369	.000	.000	.000
1720	116							040	.253	.000	.000	.000
1740	121							040	.000	.000	.000	.000
1800	143							040	.000	.000	.000	.000
1820								041	.000	.011	.033	.033
1840									.000	.000	.000	.000
1900	116							040	.000	.000	.000	.000
1920	187					173-150		040	.156	.000	.000	.000
1940	195					177-157		040	.000	.000	.000	.000
2000	187							040	.136	.000	.000	.000
2020	133							039	.000	.141	.000	.000
2040											.000	.000

TABLE A.22 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	197							040	000	.000	.000
2120	128							040	000	.000	.000
2140	119							040	000	.000	.000
2200	147							040	000	.000	.000
2220											.000
2240	195							040	000	.080	.000
2300	204							040	000	.000	.000
2320	195							040	.052	.000	.000
2340	156							041	000	.011	.000
0000											.000
0020											.000
0040											.000
0100											.000
0120											.000
0140	178							040	.058	.000	.000
0200	231							040	000	.000	.000
0220	306							040	.030	.000	.000
0240	278							040	.034	.000	.000
0300											.000
0320	280							040	000	.000	.000
0340	382							040	000	.000	.000
0400	382							041	000	.000	.000
0420	321							040	000	.000	.000
0440	302							040	000	.000	.000
0500	322							040	000	.000	.000
0520	282							040	000	.000	.000
0540	210							040	000	.000	.000
0600	180							040	000	.000	.000
0620	147							040	000	.000	.000
0640	176							041	000	.000	.000
0700	148							040	000	.078	.000
0720	176							040	000	.000	.000
0740											.000
0800	258							041	000	.026	.000
0820	233							041	000	.017	.000
0840	297							041	000	.056	.000

TABLE A.23 ROI-NAMUR TO FAIRBANKS, STAR FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	0900 GMT 9 JULY	
										BKGD AVERAGE	SINGLE BKGD DAY
0900	235							165	000	.000	.000
0920	163							050	000	.000	.000
0940	095							040	000	.000	.000
1000	112							045	000	.000	.000
1020	161							040	000	.000	.000
1040	179							040	000	.000	.000
1100	151							040	000	.000	.000
1120	112							040	000	.000	.000
1140	113							040	000	.000	.000
1200	138							040	000	.000	.000
1220	136							040	000	.000	.000
1240	136							040	000	.000	.000
1300	140							040	000	.027	.055
1320	134							040	000	.022	.045
1340	108							040	000	.000	.000
1400	109							040	000	.000	.000
1420	105							040	000	.000	.000
1440	103							040	000	.000	.000
1500	099							040	000	.068	.137
1520	091							040	000	.000	.000
1540	140							040	000	.000	.000
1600	137							055	000	.000	.000
1620	144							070	000	.000	.000
1640	144							060	000	.000	.000
1700	040							040	B	.000	.000
1720	040							040	B	.000	.000
1740	113							095	000	.000	.000
1800	134							101	000	.000	.000
1820	169							114	000	.000	.000
1840	190							128	000	.000	.000
1900	199							114	000	.000	.000
1920	200							113	000	.000	.000
1940	195							110	000	.000	.000
2000	198							067	000	.000	.000
2020											
2040											

TABLE A.23 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	SKGD AVERAGE	SINGLE SKGD DAY
2100	200								064	000	.000	.000
2120	183								073	000	.000	.000
2140	175								081	000	.000	.000
2200	185								066	000	.000	.000
2220	040								040	B	.000	.000
2240	170								068	000	.000	.000
2300	040								040	B	.000	.000
2320	040								040	B	.000	.000
2340	040								040	B	.000	.000
0000											.000	.000
0020	099								061	000	.000	.000
0040	097								062	000	.000	.000
0100	168								063	000	.000	.000
0120											.000	.000
0140											.000	.000
0200											.000	.000
0220	040								040	B	.000	.000
0240	103								064	000	.000	.000
0300	040								040	B	.000	.000
0320	173								069	000	.000	.000
0340	040								040	B	.000	.000
0400	169								062	000	.000	.000
0420	198								057	000	.000	.000
0440	106								060	000	.000	.000
0500	101								057	000	.000	.000
0520	107								060	000	.000	.000
0540											.000	.000
0600											.000	.000
0620	040								040	B	.000	.000
0640	040								040	B	.014	.029
0700	099								057	000	.019	.037
0720	181								056	000	.000	.000
0740	102								046	000	.011	.022
0800	086								044	000	.000	.000
0820	179								051	000	.000	.000
0840											.000	.000

TABLE A.24 KAUAI TO PALO ALTO, STAR FISH

0900 OCT 9 JULY

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0900	160					112-077		055	.088	.000	.000
0920	143							047	.365	.125	.027
0940	078							044	.000	.064	.041
1000											.000
1020	128					104-080		040	.273	.072	.121
1040	077							043	.000	.057	.051
1100	094					088-077		044	.220	.099	.119
1120	139					122-095		040	.114	.082	.000
1140	076		133-130				089-078	040	.000	.069	.074
1200	078							043	.000	.067	.064
1220	130					123-097		041	.427	.040	.075
1240	096					089-078		041	.200	.000	.000
1300	080							041	.000	.000	.000
1320	080					077-076		042	.026	.000	.000
1340	085					079-077		041	.045	.019	.000
1400	086							043	.000	.014	.000
1420											.000
1440											.000
1500											.000
1520											.000
1540	198					146-138		058	.457	.000	.000
1600	162		185-154 151-135			115-097	123-119	073	.382	.000	.000
1620											.000
1640	195					120-102		058	.599	.000	.000
1700	105		179-132			097-079	087-071	058	.745	.000	.000
1720	123					113-101	077-060 093-073	053	.629	.000	.000
1740											.000
1800	133							116	.000	.000	.000
1820	134							115	.000	.000	.000
1840	180							151	.000	.000	.000
1900	154							117	.000	.017	.000
1920	135							112	.000	.187	.000
1940	156							117	.000	.000	.000
2000	146		174-156					121	.000	.000	.000
2020	193							122	.254	.000	.000
2040	129							105	.000	.000	.000

TABLE A.24 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	131							121	000	.000	.000
2120	160							127	.212	.156	.000
2140	161							150	000	.000	.000
2200	132							127	000	.000	.000
2220	154							117	.622	.046	.000
2240	160							102	.293	.000	.000
2300	250							141	.743	.752	.000
2320	184							122	000	.000	.000
2340	287							121	.717	.358	.000
0000	295							121	.713	.000	.000
0020	160							121	.179	.000	.000
0040											.000
0100											.000
0120											.000
0140	154							117	.459	.000	.000
0200	160							117	.302	.013	.000
0220	160							115	.422	.006	.017
0240	160							119	.171	.000	.000
0300	160							092	.185	.000	.000
0320	163							074	.348	.011	.033
0340	161							070	.121	.000	.000
0400	160							065	.000	.011	.032
0420	183							070	.062	.034	.067
0440	171							057	.000	.031	.000
0500											.000
0520	187							048	000	.000	.000
0540	172							047	.064	.000	.000
0600	159							040	000	.000	.000
0620	157							041	.060	.000	.000
0640	130							041	000	.000	.000
0700	140							040	000	.010	.000
0720	135							042	000	.000	.000
0740	129							041	000	.021	.000
0800	133							040	000	.114	.000
0820											.000
0840	134							042	.185	.070	.000
											.000

TABLE A.25 OKINAWA TO PALO ALTO, STAR FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0900	186							115	.155	.110	.029
0920											.056
0940	130							124	000	.059	.055
1000	178							163	000	.252	.081
1020	119							114	000	.221	.000
1040	169							156	000	.269	.000
1100	181							162	000	.241	.000
1120	170							050	.767	.198	.000
1140	134							050	.083	.050	.000
1200	118							049	.333	.203	.265
1220	184							043	.326	.077	.000
1240	138							043	.095	.000	.000
1300	121							045	.000	.000	.000
1320	092							055	.135	.000	.000
1340	101							054	.000	.000	.000
1400	101							046	.055	.000	.000
1420	131							066	.185	.000	.000
1440											.000
1500											.000
1520											.000
1540											.000
1600											.000
1620											.000
1640											.000
1700											.000
1720	133							116	000	.000	.000
1740											.000
1800											.000
1820											.000
1840											.000
1900											.000
1920											.000
1940											.000
2000											.000
2020											.000
2040											.000

0900 GMT 9 JULY

TABLE A.25 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100												.000
2120												.000
2140												.000
2200												.000
2220												.000
2240												.000
2300												.000
2320												.000
2340												.000
0000												.000
0020												.000
0040												.000
0100												.000
0120												.000
0140												.000
0200												.000
0220												.000
0240												.000
0300												.000
0320												.000
0340												.000
0400												.000
0420												.000
0440												.074
0500												.000
0520												.000
0540												.000
0600												.000
0620												.000
0640												.000
0700												.000
0720												.000
0740												.000
0800												.000
0820												.000
0840												.000

0900 OCT 9 JULY

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TABLE A.26 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	199					117-109		102	.186	.049	.022
2120	184							113	.113	.100	.000
2140	179							114	.000	.120	.174
2200	201							115	.000	.058	.053
2220	201							122	.000	.000	.000
2240											.212
2300	265							124	.071	.156	.111
2320	274					139-135		115	.094	.047	.047
2340											.178
0000	276							126	.073	.311	.311
0020	283							120	.000	.151	.146
0040	278							120	.101	.443	.528
0100	288							125	.037	.202	.202
0120	289					145-141		125	.043	.252	.374
0140	289							124	.000	.301	.346
0200	289							188	.000	.237	.237
0220	280										.000
0240								122	.000	.155	.164
0300	272					141-125		108	.094	.168	.268
0320	279					157-124		120	.268	.045	.000
0340	273					153-130		118	.174	.043	.000
0400	319					191-179		109	.197	.115	.141
0420	261					149-142		126	.167	.068	.137
0440	323	198-191				152-141		174	.000	.028	.056
0500	316					147-133		121	.143	.062	.000
0520	324	200-190						180	.074	.118	.177
0540	315							153	.490	.029	.000
0600	251							174	.000	.054	.079
0620	290							117	.084	.090	.036
0640	295										.071
0700											.097
0720	300					166-155		104	.122	.077	.042
0740	329	306-289						075	.173	.237	.201
0800	320					096-091		092	.076	.152	.126
0820	317					098-086		065	.048		.250

TABLE A.27 OKINAWA TO FAIRBANKS, STAR FISH

0900 GMT 9 JULY							
TIME	MOF	GAPS IN HF SPECTRUM					0900 GMT 9 JULY
		LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY		
0900	040	040	B	000	.000		
0920					.000		
0940					.000		
1000					.000		
1020					.000		
1040					.000		
1100					.000		
1120					.000		
1140					.000		
1200					.000		
1220					.000		
1240					.000		
1300					.000		
1320					.000		
1340					.000		
1400					.000		
1420	155	064	000	.000	.000		
1440	152	063	.034	.000	.000		
1500	152	081	000	.000	.000		
1520	152	075	000	.000	.000		
1540	148	084	000	.000	.000		
1600	143	065	000	.000	.000		
1620	147	087	000	.000	.000		
1640					.000		
1700	178	072	000	.000	.000		
1720	176	071	000	.000	.000		
1740	159	080	000	.000	.000		
1800	151	123	000	.000	.000		
1820	155	092	.063	.000	.000		
1840					.000		
1900	157	080	000	.000	.000		
1920	136	087	000	.000	.000		
1940					.000		
2000	135	120	000	.000	.000		
2020	160	122	000	.000	.000		
2040	190	116	000	.000	.000		

TABLE A.27 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2100	158								114	000	.000	.000
2120	160								106	000	.000	.000
2140	152								115	000	.000	.000
2200	179								116	000	.000	.000
2220	199								112	000	.000	.000
2240	193								105	000	.000	.000
2300	154								116	000	.000	.000
2320	145								106	000	.000	.000
2340	174								114	000	.000	.000
0000												
0020	171								122	000	.000	.000
0040	138								111	000	.000	.000
0100	146								111	000	.000	.000
0120												
0140												
0200									120	000	.000	.000
0220	147								122	000	.000	.000
0240	174											
0300												
0320	180								124	000	.000	.000
0340	183								121	000	.000	.000
0400	160								113	000	.000	.000
0420	155								125	000	.000	.000
0440	160								122	000	.000	.000
0500												
0520	146								118	000	.000	.000
0540												
0600												
0620	159								122	000	.000	.000
0640	154								110	000	.000	.000
0700	189								118	000	.000	.000
0720	196								086	000	.000	.000
0740	203								053	000	.000	.000
0800	222								042	000	.000	.000
0820	219								041	000	.000	.000
0840	215								041	000	.000	.000

TABLE A.28 ROI-NAMUR TO HAWAII, CHECK MATE

TIME	MOF	GAPS IN HP SPECTRUM					LOF	EVENT DAY	RMGO AVERAGE	SINGLE RMGO DAY
0820	313	238-227	164-136	127-116	093-087	064-060	041	.077	.048	.000
0840	300		220-179		100-091	084-079	012	.135	.120	.053
0900	316						076	.229	.086	.138
0920										.178
0940										.258
1000										.300
1020										.394
1040										.203
1100										.149
1120										.132
1140										.051
1200										.220
1220										.000
1240	265									.071
1300	286						040	000	.150	.280
1320	264						042	000	.188	.391
1340	248						040	.126	.360	.447
1400	188						041	.034	.203	.154
1420	243						040	.123	.194	.257
1440	232						040	.146	.057	.000
1500	142						042	.220	.435	.579
1520	176						042	.185	.289	.504
1540	131						041	.549	.277	.424
1600	040						040	B	.055	.053
1620	073						040	.061	.270	.313
1640	079						040	.056	.248	.281
1700	136						043	.000	.146	.225
1720	168						040	.039	.058	.115
1740	148						045	.058	.060	.000
1800	148						052	.125	.129	.015
1820										.000
1840	307						065	.050	.000	.000
1900	856						194	.000	.000	.000
1920	177						050	.047	.000	.000
1940	357						038	.000	.037	.006
2000	350						040	.000	.005	.000

TABLE A.28 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	381								048	000	.147	.000
2040	374								048	000	.024	.000
2100	380								048	000	.055	.000
2120												.000
2140												.000
2200	389								060	000	.023	.000
2220	385								060	000	.008	.017
2240	379								064	000	.000	.000
2300	387								061	000	.013	.027
2320	387								054	000	.000	.000
2340	405								054	000	.046	.138
0000	423								055	000	.014	.000
0020	458								054	000	.157	.228
0040	480								063	000	.212	.106
0100	502								059	000	.025	.195
0120	542								050	000	.073	.170
0140	469								048	000	.025	.046
0200	472								051	000	.056	.127
0240												.041
0300	420								059	000	.160	.321
0320	428								063	000	.035	.084
0340												.379
0400	295								054	000	.012	.344
0420												.287
0440	364								040	000	.155	.000
0500	367								040	000	.000	.000
0520	354								040	000	.000	.000
0540	387								040	.017	.004	.000
0600	334								040	000	.008	.033
0620	337								040	000	.011	.088
0640	266								040	000	.044	.108
0700	282								040	000	.036	.022
0720												.000
0740												
0800	238								040	000	.038	.000

100-094

TABLE A.29 ROI-NAMUR TO KAUAI, CHECK MATE

0630 OCT 20 057.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	DKGO AVERAGE	SINGLE BKGD DAY
0820	286	295-264						040	000	.000	.000
0840	382							124	000	.000	.000
0900	343							043	000	.000	.000
0920	332							042	000	.000	.000
0940	342							040	000	.000	.000
1000	317							041	000	.000	.000
1020	329							041	000	.000	.000
1040	333							040	000	.000	.000
1100	360							040	000	.000	.000
1120	340							040	000	.000	.000
1140	339	319-279						041	000	.050	.000
1200	311							041	000	.021	.000
1220	284							040	.114	.000	.000
1240	269							040	000	.000	.000
1300								040	000	.000	.000
1320											.000
1340											.000
1400											.000
1420											.000
1440											.000
1500											.000
1520											.000
1540											.000
1600	132							040	000	.000	.000
1620	135							040	000	.000	.000
1640	126										.000
1700	125										.000
1720	158							040	000	.000	.000
1740	113							040	000	.000	.000
1800	150							040	000	.000	.000
1820	231							040	000	.000	.000
1840	265							046	000	.000	.000
1900	272							047	000	.000	.000
1920	308							047	000	.000	.000
1940								040	000	.000	.000
2000	381							052	.122	.000	.000

TABLE A.29 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	378	328-277						050	.155	.000	.000
2040	369							054	.000	.036	.000
2100	379							061	.000	.007	.000
2140	373							055	.000	.000	.000
2200	367							052	.000	.000	.000
2240		399-371									.000
2300											.000
2340	429							072	.000	.000	.000
2320	420							066	.000	.000	.000
0000	432							063	.076	.027	.000
0040	437							064	.000	.000	.000
0100	384							061	.000	.024	.000
0120	368							058	.000	.003	.000
0140	345							052	.000	.000	.000
0200	352							056	.000	.000	.000
0220	399	395-347						057	.140	.000	.000
0240											.000
0300	382							045	.000	.000	.000
0320	385							053	.000	.000	.000
0340	376							044	.139	.000	.000
0400	385							040	.145	.000	.000
0420	398							040	.067	.000	.000
0440	414							040	.056	.000	.000
0500	383							040	.058	.000	.000
0520	359							040	.056	.000	.000
0540	358	277-269						040	.000	.000	.000
0600	351							040	.032	.000	.000
0620	349							040	.034	.000	.000
0640	372							040	.145	.000	.000
0700	345							040	.134	.000	.000
0720	323							040	.166	.000	.000
0740	318							040	.000	.000	.000
0800	311							040	.000	.000	.000
											.000

TABLE A.30 CANTON TO FAIRBANKS, CHECK MATE

0830 GMT 20 OCT.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0820	147							047	000	.000	.000
0840	069							047	000	.011	.000
0900	083							043	000	.011	.000
0920	092							044	000	.000	.000
0940	066							043	000	.028	.000
1000	069							040	000	.000	.000
1020	081							040	000	.000	.000
1040	069							040	000	.000	.000
1100	081							044	000	.056	.000
1120	081							044	000	.000	.000
1140	075							043	000	.000	.000
1200	100							044	000	.000	.000
1220	120							042	000	.000	.000
1240	097							043	000	.000	.000
1300	093							041	000	.000	.000
1320	121							041	000	.000	.000
1340	116							042	000	.000	.000
1400	132							043	000	.000	.000
1420	118							042	000	.000	.000
1440	112							070	000	.000	.000
1500	113							040	000	.000	.000
1520	141							040	000	.000	.000
1540	133							040	030	.000	.000
1600	118							040	000	.000	.000
1620	117							040	000	.000	.000
1640	127							040	000	.000	.000
1700	136							041	000	.000	.000
1720	155							068	000	.011	.000
1740	188							105	000	.000	.000
1800	202							104	000	.006	.000
1820	221							102	000	.000	.000
1840	222							104	000	.000	.000
1900	232							105	000	.000	.000
1920	238							112	000	.000	.000
1940	235							107	000	.000	.000
2000	245							120	000	.000	.000
								118	000	.000	.000

TABLE A.30 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	269							128	000	.000	.000
2040	243							129	000	.023	.000
2100	240							126	000	.000	.000
2120	219							127	000	.000	.000
2140	230							135	000	.000	.000
2200	234							127	000	.000	.000
2220	227							151	000	.012	.000
2240											.000
2300	241							130	000	.065	.196
2320	253							141	000	.000	.000
2340	260							158	000	.000	.000
0000	239							158	000	.000	.000
0020	262							169	000	.000	.000
0040	280							179	000	.000	.000
0100	299							128	000	.000	.000
0120											.000
0140	258							132	000	.000	.000
0200	233							128	000	.040	.000
0220											.000
0240	232							105	000	.000	.000
0300	215							103	000	.000	.000
0320	212							104	000	.000	.000
0340	231							105	000	.000	.000
0400	242							087	000	.000	.000
0420	218							106	000	.000	.000
0440	204							074	000	.000	.000
0500	193							050	000	.000	.000
0520	182							040	000	.000	.000
0540	142							045	000	.000	.000
0600	138							045	000	.000	.000
0620	133							040	000	.000	.000
0640	135							050	000	.000	.000
0700	093							049	000	.041	.000
0720	091							049	000	.190	.000
0740	176					153-139	063-061	040	.103	.167	.000
0800	138							045	000	.000	.000

TABLE A.31 CANTON TO MIDWAY, CHECK MATE

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	0830 GMT 20 OCT.	
											BKGD	SINGLE
0820	153							043	.364	.105	.000	.000
0840	283							062	.376	.105	.000	.000
0900	269							054	.102	.106	.000	.000
0920	269							052	.175	.061	.000	.000
0940	289							053	.157	.024	.000	.000
1000	216							055	.161	.121	.000	.000
1020											.000	.000
1040	223							050	.000	.188	.000	.000
1100	235							053	.170	.095	.000	.000
1120	257							054	.227	.218	.000	.000
1140	261							052	.254	.200	.000	.000
1200	230							053	.158	.229	.000	.000
1220	218							053	.127	.324	.000	.000
1240	188							052	.096	.328	.000	.000
1300	159							042	.239	.071	.000	.000
1320	191							052	.000	.286	.591	.444
1340	180							052	.609	.544	.617	.617
1400	175							049	.254	.549	.674	.674
1420	161							053	.333	.348	.357	.357
1500	139							052	.506	.000	.302	.302
1520	074							052	.000	.531	.400	.400
1540	068							051	.000	.220	.172	.172
1600	117							051	.000	.398	.000	.000
1620								055	.000	.480	.235	.235
1640	109							051	.000	.275	.044	.044
1700	132							057	.216	.353	.333	.333
1720	173							084	.000	.297	.056	.056
1740	202							108	.000	.182	.075	.075
1800	228							093	.000	.153	.108	.108
1820	270							087	.000	.095	.090	.090
1840	306							060	.000	.052	.138	.138
1900	261							059	.000	.096	.043	.043
1920	265											
1940												
2000												

TABLE A.31 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	273								081	000	.054	.066
2040	272								071	000	.029	.000
2100	317								064	000	.039	.101
2120	301								112	000	.080	.079
2140	287								116	000	.006	.000
2200	297								129	000	.064	.101
2220	303								128	000	.094	.094
2240	297								131	000	.224	.238
2300												.198
2320	314								118	000	.120	.059
2340	157								110	000	.083	.067
0000	346								149	000	.079	.023
0020	394								119	000	.050	.084
0040	309								144	000	.079	.169
0100	311								138	000	.057	.118
0120												.067
0140	280								114	000	.000	.000
0200	285					140-133			106	000	.007	.000
0220	261								108	.046	.000	.000
0240	259								109	000	.000	.000
0300	263								103	000	.000	.000
0320	260					144-135			088	.075	.000	.000
0340	242					113-108			102	.029	.000	.000
0400	251								087	.121	.034	.000
0420	214					100-097			074	.018	.000	.000
0440	231								066	000	.000	.000
0500	227								066	.097	.000	.000
0520	227								057	.031	.000	.000
0540	226								040	.053	.000	.000
0600	272								040	.097	.000	.000
0620	327								040	.112	.046	.091
0640	121								040	.188	.031	.063
0700	210								042	.222	.007	.014
0720										.131	.076	.152
0740												.019
0800	173								040	.045	.082	.041

TABLE A.32 KAUAI TO WAKE, CHECK MATE

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKWD AVERAGE	SINGLE BKWD DAY
		254-242	503-475 442-365 497-475	413-397 308-281 408-389 509-294	297-275 244-200 279-196 270-193	160-118 131-127 243-230 167-148 138-120	099-092 117-109 176-167 131-111 075-072	063-061 093-086 129-110 078-072	074-072 077-075 057-050	062-060	
0820	262							040	.284	.025	.000
0840	172							040	.174	.046	.073
0900											.097
0920											.000
0940	571							046	.208	.037	.000
1000	570							044	.380	.022	.000
1020	640							046	.244	.032	.000
1040	531							141	.749	.022	.000
1100											.094
1120	289							065	.504	.047	.000
1140											.094
1200	283							064	.694	.099	.000
1220	516							063	.510	.049	.043
1240	286							047	.644	.029	.000
1300	602							059	.147	.075	.125
1320											.000
1340											.000
1400											.000
1420											.000
1440											.000
1500	040							040	B	.000	.000
1520											.000
1540											.000
1600	095							046	.469	.000	.000
1620											.067
1640											.000
1700											.000
1720											.077
1740											.081
1800											.023
1820	182							040	.162	.008	.266
1840	235							195	.000	.133	.009
1900	242							190	.000	.003	.155
1920	236							170	.000	.063	.006
1940	290							166	.000	.004	.007
2000	316							166	.000	.004	.007

0830 082 20 027.

TABLE A.32 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	267							165	000	.008	.007
2040	319							165	000	.003	.007
2100	318							163	000	.000	.000
2120	316							177	000	.163	.326
2140	317							166	000	.233	.211
2200											.356
2220	320							179	000	.124	.000
2240	315							169	000	.103	.000
2300	315							166	000	.135	.000
2320	317							207	000	.128	.000
2340	314							189	000	.127	.096
0000	313							217	000	.069	.000
0020	314							220	000	.065	.000
0040	315							164	000	.034	.000
0100	314							182	000	.000	.000
0120	294							161	000	.000	.011
0140	320							185	000	.000	.126
0200	312							165	000	.007	.000
0220	359							157	000	.007	.000
0240	319							164	000	.012	.000
0300	322							158	000	.000	.000
0320	331							166	000	.020	.007
0340	307							160	000	.119	.000
0400	293							157	000	.092	.008
0420	328							165	000	.009	.000
0440	314							047	.281	.036	.010
0500	317							040	.325	.037	.009
0520	274							040	.172	.050	.000
0540	280							040	.216	.033	.000
0600	272										.000
0620											.279
0640											.000
0700	229							040	.175	.052	.000
0720	213							040	.191	.045	.186
0740	250							040	.162	.017	.073
0800	080							040	000	.005	.000

TABLE A.33 KAUAI TO MIDWAY, CHECK MATE

TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0820	213					047-044	040	.017	.055	.000
0840	115					047-044	040	.320	.045	.000
0900	127					050-044	040	.161	.052	.000
0920	110					048-045	040	.300	.074	.000
0940	113						047	.061	.086	.000
1000	106						041	.185	.029	.000
1020	101					048-045	041	.333	.035	.000
1040	095					048-046	041	.167	.050	.000
1100	084					048-045	040	.159	.023	.000
1120	093						048	.000	.032	.000
1140	095						051	.000	.120	.000
1200	093					049-045	040	.075	.013	.000
1220	092					049-045	040	.077	.043	.000
1240	079					049-044	042	.216	.042	.000
1300	121					049-046	040	.086	.192	.000
1320	068					049-044	040	.179	.094	.148
1340									.085	.085
1400	133					048-045	041	.033	.081	.128
1420	148						041	.000	.167	.238
1440	137						041	.000	.100	.208
1500	075						042	.000	.144	.000
1520	071						042	.000	.118	.000
1540	058						041	.000	.107	.056
1600	061						041	.000	.067	.000
1620	060						041	.000	.020	.000
1640										
1700	079						051	.000	.106	.091
1720	112						042	.000	.310	.435
1740	133						053	.000	.041	.000
1800	176						053	.000	.000	.040
1820	199						052	.000	.060	.142
1840	227						052	.000	.116	.034
1900	246						052	.000	.101	.027
1920										.031
1940	284						058	.000	.036	.000
2000	271						053	.000	.058	.094

TABLE A.33 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM								LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	248									053	000	.115	.094
2040	224									053	000	.000	.000
2100	231									050	000	.037	.000
2120	252									056	000	.188	.098
2140	276									054	000	.033	.010
2200	295									057	000	.038	.000
2220	317									054	000	.043	.038
2240	334									055	000	.117	.162
2300													
2320	335									053	000	.054	.071
2340	326									054	000	.089	.037
0000	323									052	000	.057	.000
0020	328									050	000	.028	.026
0040	320									050	000	.065	.109
0100	326									051	000	.085	.071
0120	332									052	000	.020	.070
0140	312									052	000	.009	.000
0200	313									051	000	.028	.056
0220	316									040	.007	.016	.000
0240	319									040	.018	.013	.017
0300	328									040	.097	.007	.000
0320	327							110-106		083	.016	.000	.000
0340	281									046-044	.008	.000	.000
0400	230									047-044	.016	.006	.013
0420	213							110-106		040	.075	.000	.000
0440	202									048-044	.025	.000	.000
0500	179									040	.000	.000	.000
0520	162									047-045	.016	.000	.000
0540	189									047-044	.114	.081	.081
0600	153							143-129 135-129		040	.080	.014	.000
0620	167									040	.031	.023	.023
0640	126									040	.000	.149	.219
0700	187							159-155		040	.156	.057	.089
0720								170-149		040			.000
0740										040			.187
0800	222							214-202		040	.088	.077	.338
								069-065					

SECRET

TABLE A.34 CANTON TO HAWAII, CHECK MATE

0830 GMT 20 OCT.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	EMED AVERAGE	SINGLE EMED DAY
0820	301	401-368						040	000	.052	.000
0840	315							040	000	.043	.026
0900	636							040	.064	.078	.041
0920	379							040	000	.139	.109
0940	493		085-080					040	000	.085	.137
1000	576							040	000	.060	.065
1020	571							040	000	.097	.000
1040	588							040	000	.153	.000
1100	620							040	000	.191	.091
1120	552							040	000	.198	.000
1140	476							042	000	.169	.142
1200	356							040	000	.180	.000
1220	372	405-331						043	000	.194	.000
1240	539							044	.149	.216	.076
1300	350							043	000	.251	.173
1320	306							040	.019	.182	.191
1340	376		097-092					040	000	.126	.053
1400	286							044	000	.137	.000
1420	256							041	.047	.214	.124
1440	316							040	.093	.041	.041
1500	226		073-070					040	.144	.156	.033
1520	233							040	B	.120	.187
1540	235							040	000	.093	.104
1600	040							043	000	.104	.122
1620	172		079-071 080-071 083-071 109-105 100-093					052	.076	.684	.047
1640	164							053	.093	.073	.000
1700	188							055	.084	.029	.049
1720	203							057	.029	.030	.041
1740	234		065-063					104	.045	.012	.037
1800	236							059	000	.000	.000
1820	240							061	.024	.000	.000
1840	261							064	000	.000	.000
1900	267		088-083					057	000	.000	.000
1920	269							064	000	.000	.000
1940	280							057	000	.000	.000
2000	298							057	000	.000	.000

TABLE A.34 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	277							048	000	.000	.000
2040	263							051	000	.020	.000
2100	273							051	000	.000	.000
2120											
2140	245							053	000	.029	.000
2200	253							044	000	.000	.000
2220	251							056	000	.000	.000
2240	260							054	000	.000	.000
2300	265							057	000	.000	.000
2320	268							051	000	.000	.000
2340	285							052	000	.000	.000
0000	301							053	000	.000	.000
0020	317							051	000	.000	.000
0040	359							049	000	.000	.000
0100	386							040	.017	.003	.000
0120											.000
0140											.000
0200											.000
0220	396										.000
0240	310							051	000	.000	.000
0300	317							041	.019	.002	.000
0320	309							052	000	.006	.000
0340	311							051	000	.014	.000
0400	314							042	000	.030	.000
0420	319							040	000	.020	.000
0440								041	000	.008	.000
0500	342										.000
0520	338							040	000	.012	.000
0540	362							040	000	.000	.000
0600	382							040	000	.000	.000
0620	400							040	000	.000	.000
0640	390							040	000	.000	.000
0700	379							040	000	.000	.000
0720	352							040	000	.000	.000
0740								040	000	.007	.000
0800	292							040	000	.038	.000

TABLE A.35 CANTON TO WAKE, CHECK MATE

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	EMGD AVERAGE	SINGLE EMGD DAY
0820	361							040	000	.027	.000
0840	458							041	000	.025	.000
0900	432							057	.147	.011	.000
0920											.000
0940	393								000	.019	.000
1000	381							165	000	.046	.000
1020	357							162	000	.079	.000
1040	366							169	000	.090	.000
1100	371							172	000	.094	.000
1120	351							160	000	.145	.000
1140	340							079	000	.130	.271
1200	317	304-288						086	.160	.167	.000
1220	316	168-156						117	.080	.114	.000
1240	312	163-147						139	.098	.096	.017
1300	311	162-145						122	.063	.058	.047
1320		166-154									.039
1340	279							132	.463	.016	.035
1400	198	261-199						111	.184	.070	.097
1420	197	148-142						134	.111	.069	.000
1440	199	157-146						113	.116	.037	.000
1500	199	158-151						124	.267	.219	.000
1520	199	161-173						118	.417	.009	.000
1540	178	168-148						111	000	.091	.071
1600	128	160-135						091	.500	.108	.058
1620	111							075	.429	.048	.079
1640	096							057	.302	.048	.000
1700	143										.000
1720								080	000	.100	.000
1740	099							084	.171	.000	.000
1800	110							114	.198	.120	.000
1820	215							124	.107	.148	.224
1840	255	156-136						124	000	.000	.000
1900	297	184-170						122	000	.000	.000
1920	326							124	.035	.000	.000
1940	326							123	000	.000	.000
2000	323	140-133									.000

TABLE A.35 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	8460 AVERAGE	SINGLE BKGD DAY
2020	324	207-195						112	000	.000	.000
2040	308							134	000	.009	.000
2100	319							100	000	.009	.000
2120	314							114	000	.000	.000
2140	311							107	000	.000	.000
2200	312							118	000	.052	.104
2220	303							142	000	.000	.000
2240	309							165	000	.000	.000
2300	291							133	000	.000	.000
2320	281							222	000	.000	.000
2340	285							165	100	.000	.000
0000	295							133	000	.018	.000
0020	309							165	000	.000	.000
0040	318							222	000	.000	.000
0100	317							157	000	.000	.000
0120		306-277						159	000	.000	.000
0140	335							162	000	.004	.000
0200	330							076	000	.000	.000
0220	350							116	000	.017	.000
0240	361							142	000	.000	.000
0300	351							122	000	.000	.000
0320	350							121	000	.003	.000
0340	359							111	000	.007	.000
0400	370							112	000	.034	.000
0420	369							115	112	.057	.000
0440	373							089	000	.103	.081
0500	364							078	000	.082	.150
0520	370							076	115	.006	.000
0540	388							078	.129	.015	.000
0600	389										.000
0620		299-241						049	000	.087	.000
0640	370							044	.190	.036	.000
0700	350							040	000	.075	.000
0720	366							044	.132	.057	.070
0740	407	284-247									
0800											

062-051

TABLE A.36 CANTON TO VITI LEVU, CHECK MATE

0830 GMT 20 OCT.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0820	510							041	000	.021	.000
0840	642							040	000	.022	.106
0900	635							039	000	.039	.110
0920	639							042	000	.039	.067
0940	634							041	000	.135	.102
1000	633							041	000	.068	.270
1020	627							041	000	.000	.000
1040	633							041	000	.000	.000
1100	640							040	000	.009	.047
1120	555							040	000	.000	.000
1140	543							040	000	.000	.000
1200	466							040	000	.000	.000
1220	394							040	000	.013	.000
1240	395							040	000	.028	.056
1300	347							041	000	.050	.087
1320	274							041	000	.026	.144
1400	266							041	000	.028	.106
1420	250							040	000	.009	.033
1440	227							040	000	.034	.014
1500	227							040	000	.078	.136
1520								040	000	.000	.188
1540											.000
1600	129							040	000	.045	.237
1620	120							040	000	.007	.128
1640	124							040	000	.085	.022
1700											.187
1720	161							040	000	.053	.129
1740	174							040	000	.034	.101
1800	213							041	000	.000	.046
1820	270							040	000	.028	.000
1840											.050
1900	246							040	000	.025	.027
1920	222							040	000	.004	.098
1940	223							040	000	.018	.017
2000											.072

TABLE A.36 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SECRET
2020	226							039	000	.000	.000
2040	233							040	000	.000	.000
2100											.000
2120											.000
2140											.000
2200											.000
2220											.000
2240											.000
2300	283							040	000	.000	.000
2320	286							040	000	.000	.000
2340	283							040	000	.000	.000
0000											.000
0020	297							040	000	.000	.000
0040	301							040	000	.000	.000
0100	310							040	000	.000	.000
0120	310							040	000	.000	.000
0140	308							040	000	.000	.000
0200	319							040	000	.000	.000
0220	363							040	000	.000	.000
0240	322							040	000	.000	.000
0300	327							040	000	.000	.000
0320											.000
0340	300							040	000	.000	.000
0400	288							040	000	.000	.000
0420	281							040	000	.000	.000
0440	268							040	000	.000	.000
0500	259							040	000	.000	.000
0520	233							040	000	.000	.000
0540	239							040	000	.000	.000
0600	230							040	000	.000	.000
0620											.000
0640											.000
0700											.000
0720											.215
0740											.019
0800											.033
											.041

TABLE A.37 CANTON TO TUTUILA, CHECK MATE

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0820											.000
0840	636							041	000	.041	.045
0900											.056
0920	640							040	000	.066	.000
0940											.046
1000											.052
1020	640							040	000	.028	.000
1040	640							040	000	.011	.043
1100	640							040	000	.050	.000
1120	543							040	000	.008	.034
1140	467							041	000	.010	.041
1200	420							041	000	.000	.000
1220	343							041	000	.059	.104
1240	307							042	000	.024	.121
1300	314							041	000	.074	.080
1320	298							041	000	.027	.000
1340	251							042	000	.021	.000
1400	310							042	000	.043	.179
1420	269							042	000	.075	.054
1440	269							042	000	.049	.000
1500	304								.050		.000
1520		282-269									.000
1540	272		245-154					040	.392	.114	.343
1600	269		221-133					040	.384	.163	.385
1620	303				256-122			040	.559	.010	.029
1640	263	292-279	219-195	184-118				040	.390	.000	.000
1700	254	252-235	180-174	163-129				040	.407	.000	.000
1720	255	244-197	221-195	184-132				040	.307	.018	.036
1740	233	244-236	183-147	142-135				040	.388	.131	.000
1800	260	224-193						042	.000	.055	.000
1820											.000
1840	246							040	.000	.000	.000
1900	208							040	.000	.012	.000
1920	214							040	.000	.000	.000
1940	235	221-214						040	.038	.045	.000
2000	239							040	.000	.000	.000

0830 OCT 20 05Z

TABLE A.37 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BMGD AVERAGE	STANDARD DEVIATION
2020	302								040	000	.041	.000
2040									040	000	.046	.000
2100	322								040	000	.000	.000
2120	287								040	000	.000	.000
2140	191								040	000	.000	.000
2200	218								040	000	.015	.000
2220	164								040	000	.000	.000
2240	193								040	000	.000	.000
2300	191								040	000	.000	.000
2320	162								040	000	.000	.000
2340	177								040	000	.000	.000
0000	184								040	000	.040	.120
0020	194								040	000	.025	.000
0040	192								040	000	.025	.000
0100	233								040	000	.000	.000
0120									040	000	.000	.000
0140	248								040	000	.000	.000
0200	233								040	000	.020	.000
0220	267								040	000	.000	.000
0240	338								040	000	.000	.000
0300	321								040	000	.000	.000
0320	322								041	000	.000	.000
0340												.000
0400												.000
0420												.000
0440												.000
0500												.000
0520												.000
0540												.000
0600												.000
0620												.000
0640												.000
0700												.000
0720												.000
0740												.000
0800												.168
												.057

TABLE A.38 CANTON TO RAROTONGA, CHECK MATE

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0820	286					110-095	089-079	046	.104	.056	.000
0840	266					106-095	065-079	044	.063	.144	.000
0900											.000
0920	530					160-126	123-117	041	.350	.073	.000
0940	522					100-086		042	.185	.141	.000
1000	532					107-091		043	.057	.083	.000
1020	514					107-093		045	.032	.130	.000
1040	529								.184	.192	.000
1100											.000
1120	542					084-075	064-060	043	.056	.074	.000
1140	536					108-091	076-070	045	.047	.137	.000
1200	567					084-077	075-071	045	.044	.116	.000
1220	541					075-071	065-060	043	.018	.120	.000
1240											.000
1300	457					107-098	064-060	041	.024	.266	.000
1320	368						075-070	042	.043	.374	.185
1340	348							043	.013	.179	.395
1400	327							042	.000	.338	.659
1420	297							040	.000	.224	.171
1440	268							043	.036	.408	.329
1500	263							040	.018	.321	.218
1520	258					103-093	074-070	040	.073	.183	.325
1540	248					075-072	066-063	043	.068	.191	.080
1600	231					085-079	074-070	044	.048	.215	.286
1620	213					107-079	073-070	043	.059	.225	.364
1640	215					105-092		042	.197	.170	.208
1700	209					100-077		044	.084	.152	.270
1720	232					101-093	074-070	040	.141	.075	.077
1740	251					100-090	085-080	040	.062	.044	.089
1800	269					099-093	083-076	043	.071	.013	.039
1820	267							053	.061	.000	.000
1840	287							052	.051	.000	.000
1900	292							040	.000	.000	.000
1920	306							044	.000	.000	.000
1940	319							042	.000	.000	.000
2000	344					167-160		042	.023	.000	.000

0830 GMT 20 OCT.

TABLE A.38 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	344							041	000	.000	.000
2040											.000
2100	313							041	000	.000	.000
2120	294							041	000	.000	.000
2140	284							041	000	.000	.000
2200	295							042	000	.000	.000
2220	351							041	000	.000	.000
2240	325							040	000	.000	.000
2300	374							042	000	.000	.000
2320	446							040	000	.000	.000
2340	497							040	000	.000	.000
0000	484							044	000	.000	.000
0020	436							044	000	.000	.000
0040	448							040	000	.000	.000
0100											.000
0120											.000
0140											.000
0200	338							043	000	.000	.000
0220	331							044	000	.085	.000
0240	347							044	000	.000	.000
0300	357							044	000	.003	.000
0320	349							044	000	.102	.000
0340	342							044	000	.006	.000
0400	354							044	000	.002	.000
0420	347							054	000	.029	.034
0440	336							044	000	.032	.026
0500	335						074-071	044	.010	.015	.030
0520	333							045	000	.020	.040
0540	332							044	000	.018	.055
0600	333							043	000	.000	.000
0620	316							043	000	.000	.000
0640	319							043	000	.014	.000
0700	315						106-092 109-097	045	.021	.028	.000
0720	334						103-091	044	.044	.068	.122
0740								043	.041	.056	.059
0800	306						109-097	047	.046	.097	.290

TABLE A.39 ROL-NAMUR TO TUTUILA, CHECK MATE

0830 GMT 20 OCT.

TIME	MOF	GAPS IN MF SPECTRUM					LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0820	339						040	000	.021	.103
0840	358						040	000	.012	.000
0900	355						040	000	.083	.000
0920										.000
0940	455						040	000	.019	.000
1000										.000
1020	357						040	000	.014	.000
1040	361						041	.047	.008	.000
1100	293						040	000	.045	.027
1120	337						040	000	.033	.000
1140	349						041	000	.027	.000
1200	322						041	000	.018	.000
1220	332						041	000	.048	.019
1240	313						042	000	.050	.000
1300	307						042	000	.029	.000
1320	306						041	000	.036	.000
1340	302						042	000	.089	.147
1400	312						041	000	.051	.102
1420	308						042	000	.000	.000
1440	323						042	000	.039	.000
1500	305						042	000	.000	.000
1520										.133
1540	266						042	000	.044	.088
1600	255						042	.066	.048	.037
1620	215						040	000	.006	.012
1640	203						040	000	.028	.000
1700	204						040	000	.000	.000
1720	158						040	000	.064	.000
1740	197						042	000	.025	.000
1800	226						042	000	.038	.000
1820	282						048	000	.062	.000
1840	244								.187	.000
1900	247						053	000	.083	.000
1920	266						052	000	.009	.000
1940	275						064	.005	.000	.000
2000	261						054	000	.000	.000

TABLE A.39 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	248							053	000	.000	.000
2040	248							055	000	.000	.000
2100	245							051	000	.000	.000
2120	243							059	000	.014	.032
2140	250							057	000	.101	.000
2200	251							062	.053	.000	.000
2240	261							071	000	.000	.000
2300	267							073	000	.000	.000
2320	269							082	.037	.000	.000
2340	282							072	000	.000	.000
0000	292							073	.014	.025	.000
0020	300							073	000	.009	.000
0040	311							074	000	.028	.008
0100	315							073	.062	.003	.000
0120	332							065	000	.004	.000
0140	346							065	000	.000	.000
0200	357							067	000	.001	.000
0220	352							065	000	.005	.000
0240	378							067	000	.004	.000
0300	371							066	000	.002	.000
0320											.000
0340											.000
0400											.000
0420											.000
0440											.000
0500											.000
0520											.000
0540											.000
0600											.000
0620											.000
0640											.000
0700											.000
0720											.000
0740											.092
0800											.000

TABLE A.40 ROI-NAMUR TO VITI LEVU, CHECK MATE

0830 ONT 20 057.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0820								041	000		.026
0840	280							040	000	.028	.032
0900	277							040	000	.064	.000
0920	291							041	000	.000	.015
0940	333							041	000	.000	.000
1000	339							041	000	.075	.089
1020	349							041	000	.035	.000
1040	389							041	000	.011	.000
1100	407							041	000	.023	.000
1120	462							040	000	.003	.000
1140	399							040	000	.031	.033
1200	475							040	000	.016	.066
1220	473							040	000	.011	.033
1240	487							040	000	.122	.000
1300	472							040	000	.097	.043
1320								042	000	.100	.037
1340	432									.017	.017
1400	419							041	000	.088	.043
1420	419							041	000	.074	.053
1440	354							041	000	.102	.031
1500	321							040	000	.015	.046
1520								040	000	.041	.124
1540											.144
1600	290							040	000	.107	.128
1620	238							040	000	.159	.119
1640	231							041	000	.122	.057
1700	209							040	000	.106	.000
1720											.063
1740	190							040	000	.118	.095
1800	193							040	000	.146	.140
1820	201							041	000	.022	.000
1840	225							040	000	.023	.000
1900											.000
1920	179							040	000	.000	.000
1940	252							040	000	.000	.000
2000	268							040	000	.000	.000

TABLE A.40 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	8KGD AVERAGE	SINGLE 8KGD DAY
2020	272							040	000	.003	.000
2040											.000
2100											.000
2120											.000
2140	299										.000
2200											.034
2220											.014
2240											.000
2300	332							056	000	.000	.000
2320								054	000	.000	.000
2340								055	000	.000	.000
0000								052	000	.000	.000
0020	366							056	000	.000	.000
0040											.000
0100											.000
0120											.000
0140											.000
0200											.000
0220											.000
0240											.000
0300	346										.000
0320								040	000	.000	.000
0340								040	000	.000	.000
0400								040	000	.000	.000
0420	333							040	000	.008	.000
0440								040	000	.000	.000
0500								040	000	.000	.000
0520								040	000	.000	.000
0540	283							040	000	.000	.000
0600								040	000	.000	.000
0620								040	000	.000	.000
0640								040	000	.000	.000
0700											.000
0720											.000
0740											.000
0800											.155

TABLE A.41 ROI-NAMUR TO RAROTONGA, CHECK MATE

0630 OCT 20 OCT.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	DAKED AVERAGE	SINGLE BKGD DAY
0820	289	309-275	174-153	148-128	106-097	066-062	065-061	044	.102	.078	.179
0840	333		159-152		106-094	086-079		046	.213	.272	.385
0900	277				157-094	084-060		041	.153	.176	.140
0920	263		160-135	123-117	110-096	083-078	062-059	040	.305	.095	.109
0940	285		160-135	123-117	104-095	075-071		056	.227	.173	.056
1000	247		159-147	139-135	123-118			061	.215	.110	.075
1020	257					076-068		085	.122	.075	.048
1040	257							044	.056	.087	.040
1100											.101
1120	294			123-116	074-070		062-058	045	.060	.079	.138
1140	294		160-142		105-097			062	.095	.132	.097
1200	270			122-115	099-089	076-069		064	.039	.055	.090
1220	288							062	.106	.072	.062
1240											.134
1300	321				103-091			063	.047	.212	.187
1320	283							041	.000	.136	.082
1340	279						055-049	042	.025	.131	.189
1400	288					063-060	055-051	044	.029	.161	.192
1420	267					080-069	063-059	044	.099	.156	.156
1440	230							045	.038	.167	.136
1500	216						063-059	045	.029	.232	.229
1520	211					064-062	054-051	046	.048	.328	.296
1540	218				074-072	064-061	054-052	046	.041	.400	.198
1600	235				074-071	065-061		046	.042	.200	.158
1620	193				074-071	072-069		042	.129	.093	.108
1640	221	210-201	159-145			073-069		045	.159	.093	.022
1700	190			123-118			061-058	045	.067	.097	.000
1720	171						061-058	052	.025	.009	.018
1740	174							055	.009	.009	.000
1800	268	253-238	223-197		072-070			062	.209	.009	.000
1820	278							074	.000	.057	.000
1840	286							074	.000	.000	.000
1900	309					071-069		064	.008	.028	.000
1920	302							072	.000	.038	.061
1940	316	167-160				072-069		067	.029	.004	.000
2000	333							067	.011	.003	.000

TABLE A.41 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	SKED AVERAGE	SINGLE SKED DAY
2020	356							064	000	.003	.000
2040	321							071	000	.000	.000
2100	351							072	000	.033	.100
2140	337							076	.023	.098	.000
2200	327							076	.036	.081	.044
2220	311	293-282						077	.047	.095	.190
2240	318							082	000	.061	.056
2300	324							111	000	.000	.000
2320	381							078	000	.051	.000
2340	399							077	000	.000	.000
0000	411							108	000	.110	.000
0020	421	165-160						103	.016	.136	.000
0040	418	168-160						107	.026	.049	.000
0100										.024	.000
0120										.000	.000
0140	399							073	.058	.154	.000
0200	413							110	.069	.070	.000
0220	449							108	000	.046	.000
0240	432							107	000	.179	.115
0300	455							110	.043	.058	.106
0320	401							111	000	.009	.000
0340	343							105	.097	.044	.039
0400	346							088	000	.028	.065
0420	309							103	000	.013	.000
0440	346							072	.022	.047	.113
0500	330							075	.024	.025	.031
0520	312							064	000	.028	.041
0540	313							057	000	.078	.034
0600	308							056	000	.015	.000
0620	331							046	000	.024	.000
0640	328							044	000	.021	.000
0700	316							045	000	.029	.000
0720	308							047	000	.076	.046
0740									000		.086
0800	275							048	000	.126	.347

TABLE A.42 ROI-NAMUR TO MIDWAY, CHECK MATE

0830 082 20 057.

TIME	MOF	GAPS IN HF SPECTRUM				LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0820	228					043	.011	.041	.000
0840	284					040	.000	.022	.000
0900	281					040	.000	.011	.000
0920	264					044	.014	.029	.000
0940	275					040	.000	.019	.000
1000	283					041	.025	.006	.000
1020	297					041	.020	.013	.000
1040	317					041	.000	.025	.000
1100	306					040	.015	.020	.000
1120	316					040	.007	.014	.000
1140	304					040	.011	.006	.000
1200	314					051	.000	.000	.000
1220	317					051	.000	.009	.000
1240	322					048	.000	.000	.000
1300	314					048	.000	.000	.000
1320	319					048	.000	.000	.000
1340								.055	.143
1400	327							.090	.097
1420	294					041	.010	.090	.149
1440	298					050	.000	.042	.037
1500	290					049	.000	.051	.054
1520	224					045	.000	.064	.020
1540	162					049	.000	.238	.000
1600	138					044	.000	.102	.109
1620	125					051	.000	.047	.000
1640								.192	.000
1700	108								.079
1720	101					041	.000	.140	.130
1740	099					048	.000	.132	.106
1800	106					042	.000	.102	.000
1820	129					041	.000	.000	.000
1840	158					041	.000	.000	.000
1900	226					045	.000	.011	.021
1920						045	.000	.054	.018
1940	288								.011
2000	331					068	.000	.000	.000
						057	.000	.021	.000

TABLE A.42 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY	EMGD AVERAGE DAY	SINGLE EMGD DAY
2020	330						057	000	.003	.009
2040	326						061	000	.014	.029
2100	343						052	000	.008	.016
2120	344						071	000	.022	.014
2140	368						070	000	.013	.000
2200	371						076	000	.000	.000
2220	380						066	000	.000	.000
2240	378						090	000	.004	.000
2300									.000	.000
2320	375						083	000	.000	.000
2340	372						080	000	.009	.017
0000	352						063	000	.000	.000
0020	351						081	000	.005	.016
0040	340						083	000	.010	.031
0100	363						076	000	.009	.013
0120	374						070	000	.006	.013
0140	396						071	000	.000	.000
0200	425						069	000	.010	.000
0240	431						064	000	.000	.000
0300	425						059	000	.004	.000
0320	420						065	.017	.003	.008
0340	419						058	000	.000	.000
0400									.113	.113
0420	359						056	.013	.000	.000
0440	354						055	.010	.003	.009
0500									.002	.000
0520	363						052	000	.003	.000
0540	333						040	.017	.005	.000
0600	335						040	.044	.005	.007
0620	130						040	.022	.011	.027
0640	280						040	.037	.017	.007
0700	260						040	000	.003	.000
0720									.019	.019
0740									.000	.000
0800	223						040	.033	.031	.017

0830 OCT 20 OCT.

202

SECRET

TABLE A.43 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	306				168-155	126-120	074-070	062	.094	.000	.000
2100	274					125-119	109-105	061	.066	.005	.000
2120	274						109-103	053	.027	.000	.000
2140	276						125-105	060	.093	.006	.000
2200	280						109-105	063	.037	.029	.000
2220	276						106-102	068	.192	.051	.000
2240	288						108-103	062	.146	.000	.000
2300	304	209-202	177-148			124-122		062	.050	.000	.000
2320	305	211-202	167-150			125-121		061	.033	.000	.000
2340	303	210-202						065	.122	.000	.000
0000	301	208-200						061	.000	.030	.000
0020	315	205-190	161-147					169	.000	.080	.000
0040	275							064	.000	.023	.000
0100	252							063	.000	.036	.000
0120	302							054	.000	.009	.000
0140	313	222-203						055	.077	.026	.000
0200	299	223-195						054	.108	.040	.000
0220	292	226-194						050	.132	.028	.000
0240	305	223-204			181-154			054	.000	.067	.000
0300	296				181-154			040	.000	.025	.000
0320								043	.107	.000	.000
0340										.000	.000
0400										.000	.000
0420										.000	.000
0440										.000	.000
0500										.000	.000
0520										.000	.000
0540										.000	.000
0600										.000	.000
0620										.000	.000
0640										.000	.000
0700										.000	.000
0720										.044	.012
0740										.212	.260
0800										.419	.419

TABLE A.44 ROI-NAMUR TO PALO ALTO, CHECK MATE

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	0830 GMT 20 OCT.	
											SINGLE BKGD DAY	
0820	124					112-101		040	.131	.080	.320	
0840											.540	
0900	120							043	000	.154	.423	
0920	128							043	000	.206	.300	
0940	102							040	000	.075	.274	
1000	099							040	000	.064	.186	
1020	053							040	000	.095	.419	
1040	092							040	000	.091	.306	
1100	096					079-076		040	.054	.074	.000	
1120	108							044	000	.114	.000	
1140	120							040	000	.072	.000	
1200	117							045	000	.082	.212	
1220	091							040	000	.118	.200	
1240											.240	
1300	057							043	000	.129	.000	
1320	091							044	000	.000	.000	
1340											.000	
1400											.063	
1420											.108	
1440	157							040	000	.036	.180	
1500	098							057	000	.090	.213	
1520	148							049	000	.106	.167	
1540	158							041	000	.083	.000	
1600	154							049	000	.000	.000	
1620	152							046	000	.000	.000	
1640	128							056	000	.000	.000	
1700	210							097	000	.000	.000	
1720	213				175-148			144	000	.250	.000	
1740	255							177	000	.000	.000	
1800	247							129	000	.000	.000	
1820	247							141	000	.155	.000	
1840	256				174-153			158	.198	.234	.177	
1900	275							135	000	.071	.000	
1920	245							129	000	.150	.000	
1940	252				174-134			075	.305	.059	.000	
2000	275					099-085		135	000	.013	.000	

TABLE A.44 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2040	281								131	000	.000	.000
2100	278								132	000	.016	.000
2120	268								125	000	.000	.000
2140	271								160	000	.000	.000
2200	277								135	000	.036	.000
2220	335								131	000	.000	.000
2240	349								137	000	.000	.000
2300	310								125	000	.000	.000
2320	328								120	000	.051	.000
2340	350								129	000	.000	.000
0000	334								125	000	.000	.000
0020	348								101	000	.000	.000
0040	338								125	000	.000	.000
0100	341								118	000	.000	.000
0120	328								115	000	.000	.000
0140	351								111	000	.110	.000
0200	343								107	000	.069	.000
0220	306								115	000	.124	.000
0240	267								114	000	.068	.224
0300	145								098	000	.047	.203
0320											.177	.000
0340											.000	.000
0400	129								106	000	.000	.000
0420	087								063	000	.071	.000
0440	076								073	000	.014	.000
0500	136								076	000	.045	.000
0520	135								048	000	.035	.134
0540	125								061	000	.020	.104
0600	125								043	.122	.000	.059
0620	135								066	.101	.038	.000
0640	119								041	.103	.018	.113
0700	136								040	.208	.000	.000
0720	102								040	.113	.113	.000
0740	122								040	.280	.020	.225
0800	122								040	.000	.050	.000
0820	124								040	.131	.080	.078

TABLE A.45 OKINAWA TO HAWAII, CHECK MATE

0830 OCT 20 OCT.

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0820	133	400-368	329-229	163-135	120-114	097-089	085-069	065-059	061-047	000	.163	.000
0840	134									.468	.532	.632
0900	453									.430	.420	.746
0920	125									000	.419	.001
0940	040	1000	1020	1040	1060	1080	1100	1120	1140	B	.180	.000
1000	040									B	.235	.000
1020	143									000	.281	.000
1040	088									000	.740	.000
1100	093	1120	1140	1160	1180	1200	1220	1240	1260	.065	.118	.000
1120	040									000	.182	.000
1140	040									B	.247	.000
1200	040									B	.291	.000
1220	100	1240	1260	1280	1300	1320	1340	1360	1380	000	.158	.000
1240	363									.793	.274	.000
1300	087									.480	.133	.000
1320	067									.357	.000	.000
1340	069	1400	1420	1440	1460	1480	1500	1520	1540	.143	.218	.000
1400	070									.250	.195	.000
1420	068									.250	.195	.000
1440	068									.250	.195	.000
1500		1600	1620	1640	1660	1680	1700	1720	1740			.000
1520												.000
1540												.000
1600												.000
1620	040	1700	1720	1740	1760	1780	1800	1820	1840	B	.293	.293
1640												.000
1700	130											.000
1720	071									.313	.200	.400
1740	110	1800	1820	1840	1860	1880	1900	1920	1940	.188	.352	.000
1800										.354	.593	.593
1820												.725
1840	091											.001
1900		2000								000	.235	.429
1920												.000
1940												.000
2000												.000

TABLE A.45 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020											.000
2040											.000
2100	208							122	.651	.110	.329
2120											.207
2140	272							181	000	.043	.053
2200	268							178	000	.114	.000
2220											.000
2240	294							167	000	.180	.214
2300	304							188	000	.232	.353
2320	303							194	000	.000	.000
2340	314							190	000	.228	.295
0000	315							199	000	.180	.000
0020	284							183	000	.000	.000
0040	287							190	000	.223	.000
0100	378							222	000	.109	.000
0120	317							192	000	.022	.000
0140											.000
0200	403							193	000	.018	.000
0220	417							187	000	.000	.000
0240											.000
0300	423							175	000	.067	.000
0320	419							190	000	.065	.000
0340	290							195	000	.044	.000
0400	267							167	000	.059	.000
0420											.000
0440											.000
0500	260							160	000	.088	.000
0520	257							161	000	.096	.000
0540	219							120	000	.042	.000
0600	248							112	.235	.100	.000
0620	040							040	B	.000	.000
0640	040							040	B	.368	.000
0700	132							109	000	.261	.000
0720	149							107	000	.226	.000
0740											.000
0800	134							112	000	.242	.000

TABLE A.46 CANTON TO PALO ALTO, CHECK MATE

0830 GMT 20 OCT.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	SKGD AVG'D DAY	SINGLE BKGD DAY
0820	101							040	000	.149	.000
0840	121							042	000	.156	.200
0900	120							041	000	.209	.215
0920	102							049	000	.064	.350
0940	103							080	000	.000	.000
1000	101							041	000	.072	.000
1020	097							062	.050	.128	.000
1040	040							040	8	.000	.000
1100	112							043	000	.000	.000
1120	104							040	000	.103	.000
1140	124							040	000	.094	.000
1200	103							040	.079	.100	.000
1220	074							040	000	.063	.000
1240										.000	.000
1300										.000	.000
1320	113							047	000	.069	.000
1340										.000	.000
1400	129							042	000	.071	.000
1420	160							040	000	.041	.000
1440										.000	.000
1500	160									.090	.000
1520	207							049	000	.163	.000
1540	228							054	000	.000	.000
1600	229							127	000	.000	.000
1620	243							043	000	.000	.000
1640								061	000	.000	.000
1700										.000	.000
1720	221							166	000	.000	.000
1740	259							176	000	.000	.000
1800	232							138	000	.000	.000
1820	204							133	.277	.000	.000
1840	236							113	000	.000	.000
1900	250							136	.220	.000	.000
1920									000	.000	.000
1940	249							127	.320	.000	.000
2000	269							130	000	.077	.167

TABLE A.46 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	287	174-107						090	.340	.000	.000
2040	284							127	.000	.000	.000
2100	277							163	.000	.000	.000
2120	269							107	.000	.000	.000
2140	270	086-079						162	.000	.000	.000
2200	277							126	.000	.000	.000
2220	291							131	.000	.000	.000
2240	288							136	.000	.000	.000
2300	292							128	.000	.000	.000
2320	310							135	.000	.000	.000
2340	319							159	.000	.000	.000
0000	310							095	.000	.000	.000
0020	297							111	.000	.016	.000
0040	307							133	.000	.000	.000
0100	318	086-079						116	.000	.000	.000
0120	307							118	.000	.000	.000
0140	310							099	.000	.093	.186
0200	304							111	.000	.000	.000
0220	278							095	.000	.123	.185
0240								095	.000	.225	.320
0300	231							092	.000	.021	.242
0320	215							064	.000	.065	.064
0340	129							055	.000	.093	.075
0400	143							023	.000	.045	.135
0420	134	086-079						048	.081	.013	.000
0440	146							041	.000	.012	.000
0500	040							040	B	.024	.000
0520	091							041	.000	.087	.000
0540	119							044	.000	.076	.000
0600	122							043	.000	.103	.000
0620	148							040	.093	.064	.000
0640	040							040	B	.156	.125
0700								040	.162	.032	.113
0720	139							040	.153	.038	.065
0740	138							040	.291	.135	.254
0800	095							040			

TABLE A.47 KAUAI TO RAROTONGA, CHECK MATE

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0820									040			.348
0840									041	.677	.415	.000
0900	634								041	.573	.514	.562
0920	641								045	.600	.384	.464
0940	640								045	.738	.625	.625
1000	640								061	.727	.403	.353
1020	640										.378	.458
1040												.549
1100												.001
1120	640								045	.571	.282	.618
1140	573								045	.936	.465	.077
1200	530								043	.885	.211	.340
1220	640								043	.759	.348	.211
1240												.195
1300	640								054	.642	.227	.225
1320	640								055	.858	.220	.327
1340	620								040	.903	.524	.372
1400	230								040	.758	.372	.372
1420	612								044	.911	.479	.337
1440	299								040	.878	.454	.217
1500	318								040	.031	.430	.346
1520	312								040	.842	.453	.000
1540	609								044	.920	.461	.200
1600	640								040	.912	.312	.101
1620	071								064	.000	.470	.481
1640	067								065	.000	.528	.578
1700	256								064	.760	.349	.236
1720	320								064	.371	.275	.299
1740	313								138	.000	.220	.215
1800	309								124	.042	.236	.232
1820	303								127	.000	.144	.099
1840	280								125	.000	.169	.090
1900	305								068	.130	.187	.000
1920	314								060	.085	.083	.037
1940	308								066	.069	.168	.167
2000	311											

TABLE A.47 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2020	304		294-285	173-153	124-117	108-100	091-079		.152	.023	.023
2040	280			192-154	123-117	087-079			.295	.134	.134
2100	280			167-153		084-079			.099	.188	.188
2120	276			184-157	148-137	088-079			.203	.090	.079
2140	274			187-152	121-115	102-097	088-079		.239	.077	.000
2200	275			164-152		087-080			.121	.149	.139
2220	272			200-154		086-079			.257	.147	.000
2240	282			179-157					.132	.053	.000
2300	262					085-077			.000		.000
2320	302			189-156	125-119				.167	.236	.000
2340	337			169-153	123-112	088-079			.079	.218	.000
0000	317		238-226	187-160	124-118	104-098	088-079		.184	.138	.000
0020	318			216-142		105-098			.408	.115	.000
0040	316			216-153					.280	.100	.000
0100											.000
0120	315			219-154		106-088			.316	.204	.000
0140	315			201-146	123-116	105-079			.335	.269	.000
0200	315			185-151	123-116	105-077			.262	.104	.000
0220	314			201-145		106-079			.318	.122	.112
0240	313		243-228	203-154	150-134	124-116	105-079		.446	.314	.556
0300	317			188-146		105-095	089-079		.242	.366	.050
0320	316				122-117	102-094	090-079	051-045	.120	.199	.284
0340											.161
0400											.087
0420	316				123-119	100-090	087-081	047-045	.091	.000	.000
0440		440-409	392-317			084-079	071-069		.189	.017	.000
0500	640	500-482		161-157		085-080	072-070		.048	.056	.000
0520	640	518-494	428-387	207-189		105-091	085-078		.177	.000	.000
0540	640	380-365	348-321	200-192					.083	.000	.000
0600											.000
0620											.000
0640	640	418-361	232-225			104-090	086-077		.149	.174	.035
0700	640	430-363	299-288	235-176		148-104	097-092		.313	.015	.182
0720	640	459-346	241-220	155-145					.241	.000	.030
0740					126-112						.000
0800	640	509-471	436-340			100-079		043	.283	.499	.000

TABLE A.48 ROI-NAMUR TO WAKE, CHECK MATE

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0820	195							040	000	.000	.000
0840	272							040	000	.009	.000
0900	178							040	.022	.000	.000
0920											.123
0940	327							040	.024	.000	.000
1000	328							040	.021	.000	.000
1020	356							040	.000	.000	.000
1040	372							040	.018	.000	.000
1100	410							040	.059	.000	.000
1120	409							040	.024	.000	.000
1140	377							040	.021	.000	.000
1200	379							040	.000	.000	.000
1220	372							040	.000	.000	.000
1240	376							040	.000	.000	.000
1300	374							040	.041	.000	.000
1320								040	.313	.000	.000
1340											.625
1400											.000
1420	307							040	.011	.000	.000
1440	283							040	.000	.009	.000
1500	254							040	.079	.000	.147
1520	195							040	.045	.067	.000
1540	151							040	.000	.027	.133
1600	127							040	.023	.000	.053
1620	103							040	.000	.000	.000
1640	089							039	.000	.048	.000
1660	083							040	.000	.090	.018
1700	085							040	.000	.203	.610
1720											.001
1740	076							039	.000	.227	.128
1800	073							040	.000	.029	.000
1820	080							039	.073	.020	.000
1840	096							042	.000	.006	.013
1900	126							040	.023	.021	.038
1920	144							040	.000	.000	.018
1940	156							040	.000	.006	.000
2000	167							040	.000	.000	.000

0830 GMT 20 OCT.

TABLE A.48 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SMALLEST STANDARD DEV
2020	170							040	000	.000	.000
2040	177							040	000	.004	.013
2100	185							048	000	.000	.000
2120	188							040	000	.000	.000
2140	199							049	000	.000	.000
2200	211							049	.062	.000	.000
2220	213							044	.000	.000	.000
2240	180							054	.000	.000	.000
2300	200							077	.000	.000	.000
2320	190							049	.000	.000	.000
2340											
0000	178										
0020	175							048	.046	.006	.000
0040	174							066	.000	.000	.000
0100	206							080	.000	.000	.000
0120	229							075	.000	.000	.000
0140	249							072	.000	.000	.000
0200	203							071	.000	.000	.000
0220	229							066	.000	.000	.000
0240	205							041	.000	.000	.000
0300	217							040	.000	.000	.000
0320	219							040	.000	.000	.000
0340	230							046	.000	.000	.000
0400	231							042	.000	.000	.000
0420	283							048	.000	.000	.000
0440	231							040	.000	.000	.000
0500	248							040	.000	.141	.424
0520	259							040	.000	.000	.000
0540	251							040	.000	.000	.000
0600	246							040	.000	.000	.000
0620								040	.000	.000	.000
0640											
0700	194							040	.015	.000	.000
0720	193							040	.000	.000	.044
0740	204							040	.000	.000	.000
0800	195							040	.000	.000	.000

TABLE A.49 ROI-NAMUR TO FAIRBANKS, CHECK MATE

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	0830 GMT 20 OCT.	
											SINGLE BKGD DAY	
0820	149							040	000	.000	.000	
0840	094							042	000	.000	.000	
0900	095							044	000	.000	.000	
0920	102							044	000	.000	.000	
0940	092							040	000	.000	.000	
1000	092							040	000	.000	.000	
1020	092							040	000	.000	.000	
1040	098							040	000	.000	.000	
1100	093							042	000	.000	.000	
1120	120							043	000	.000	.000	
1140	122							043	000	.000	.000	
1200	144							043	000	.000	.000	
1220	141							043	000	.000	.000	
1240	135							040	000	.000	.000	
1300	138							041	000	.000	.000	
1320	137							041	000	.000	.000	
1340	160							041	000	.000	.000	
1400	157							041	000	.000	.000	
1420	152							041	000	.000	.000	
1440	156							040	000	.000	.000	
1500	145							040	000	.000	.000	
1520	151							040	000	.000	.000	
1540	143							040	000	.000	.000	
1600	136							040	000	.000	.000	
1620	118							040	000	.000	.000	
1640	110							040	000	.000	.000	
1700												
1720	097							044	000	.000	.000	
1740	098							045	000	.000	.000	
1800	115							040	000	.000	.000	
1820	136							065	000	.000	.000	
1840	183							077	000	.000	.000	
1900	214							087	000	.000	.000	
1920	243							087	000	.000	.000	
1940	258							091	000	.000	.000	
2000	242							091	000	.000	.000	

TABLE A.49 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	EMGD AVERAGE	SINGLE EMGD DAY
2020	241							097	000	-.000	.000
2040	237							091	000	-.000	.000
2100	235							102	000	-.000	.000
2120	242							110	000	.045	.091
2140	264							111	000	.040	.000
2200	271							100	000	.000	.000
2220	269							134	000	.000	.000
2240											
2300	251							129	000	.044	.132
2320	257							166	000	.000	.000
2340	238							134	000	.000	.000
0000	255							129	000	.027	.082
0020	253							119	000	.000	.000
0040	299							128	000	.156	.156
0100	295							068	000	.000	.000
0120	321							122	000	.000	.000
0140	304							115	000	.000	.000
0200	302							110	000	.000	.000
0220											
0240	239							114	000	.000	.000
0300	226							116	000	.000	.000
0320	238							105	000	.000	.000
0340	251							101	000	.000	.000
0400	228							098	000	.000	.000
0420	208							075	000	.066	.197
0440	213							062	000	.000	.000
0500	209							054	000	.000	.000
0520	202							060	000	.000	.000
0540	193							052	000	.000	.000
0600	187							046	000	.000	.000
0620	173							040	000	.000	.000
0640	169							040	000	.043	.000
0700	169							040	000	.000	.000
0720	157							040	000	.000	.000
0740	155							040	000	.000	.000
0800	134							042	000	.000	.000
0820	149							040	000	.000	.000

TABLE A.50 OKINAWA TO TUTUILA, CHECK MATE

0830 ONT 20 OCT.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	DKGD AVERAGE	SINGLE DKGD DAY
0820	321							080	000	.085	.000
0840	339							040	.054	.162	.000
0900											.117
0920											.068
0940	351							081	.070	.160	.217
1000											.237
1020	316							077	.109	.144	.124
1040	314							077	.207	.149	.076
1100	255							085	.282	.214	.224
1120	295							087	.202	.202	.309
1140	311							086	000	.174	.380
1200	297							084	000	.125	.061
1220	316							081	000	.157	.067
1240	302							084	.041	.209	.439
1300	290							083	000	.311	.306
1320	295							056	.042	.259	.330
1340	267							063	.029	.368	.372
1400	269							110	.038	.168	.330
1420	265							110	.090	.306	.037
1440											.255
1500	271							065	.029	.146	.213
1520								065	.261	.252	.331
1540	207							056	.309	.000	.195
1600	195										.467
1620								063	.208	.245	.000
1640	135							065	.104	.040	.079
1700	142							063	.138	.468	.590
1720	157							056	000	.316	.410
1740	173							085	000	.280	.468
1800	183							063	.033	.110	.000
1820	185							090	000	.270	.250
1840	182							085	.261	.346	.311
1900	154							065	.566	.310	.000
1920	141							091	.525	.123	.000
1940	131							100	.613		.000
2000	131										.000

TABLE A.50 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	EXGD AVERAGE	SINGLE EXGD DAY
2020	040					126-122		040	B		.000
2040	154							114	.100	.360	.000
2100											.000
2120											.000
2140	236										.000
2200	293										.000
2220	290										.000
2240	299										.000
2300	294										.000
2320	295										.000
2340	298										.000
0000	309										.000
0020											.000
0040	321										.000
0100	334										.000
0120	334										.000
0140	343										.000
0200	297										.000
0220	297										.000
0240	309										.000
0300	314										.000
0320	322										.000
0340											.000
0400											.000
0420											.000
0440											.000
0500											.000
0520											.000
0540											.000
0600											.000
0620											.000
0640											.000
0700											.000
0720											.000
0740											.000
0800											.000

TABLE A.51 ROI-NAMUR TO HAWAII, BLUE GILL

1000 GMT 26 OCT.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1000	361							041	.088	.064	.000
1020	313							041	.022	.052	.000
1040	306										.000
1100	287								.088	.071	.000
1120	271								.123	.010	.000
1140	345								.088	.085	.000
1200	319								.194	.036	.000
1220	287								.043	.094	.000
1240	309								.078	.013	.000
1300	247								.000	.024	.000
1320	198								.053	.000	.000
1340	200								.051	.032	.000
1400	239								.025	.124	.000
1420	232								.071	.034	.000
1440	224								.042	.052	.000
1500									.033	.097	.028
1520											.000
1540											.000
1600											.000
1620											.020
1640	188										.143
1700	190								.179	.020	.040
1720	185								.351	.000	.000
1740	213								.076	.032	.064
1800	279								.012	.025	.024
1820									.000	.045	.060
1840	335										.000
1900	366								.000	.000	.000
1920	319								.025	.000	.000
1940	323								.000	.000	.000
2000	350								.000	.000	.000
2020	368								.000	.000	.000
2040	369								.000	.000	.112
2100	409								.000	.000	.000
2120	439								.000	.000	.000
2140									.000	.000	.000

TABLE A.51 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2200	456	429-377	181-173	147-133	121-111	101-097	101-089	111	000	.000	.022
2220	443							085	000	.000	.000
2300	440							097	.023	.015	.000
2320	438							110	000	.000	.000
2340	466	515-489 438-324 439-380	149-135 189-169 150-130	101-078	084-070	059-053	077-068 067-062	123	000	.044	.088
0000	445							123	.150	.107	.019
0040	359							099	000	.072	.008
0100	414							123	000	.035	.020
0120	425							091	000	.013	.013
0140	407							108	000	.010	.012
0200								089	.013	.000	.000
0220	341							077	000	.049	.099
0240	431							071	000	.000	.000
0300	394							061	000	.138	.275
0320	392	241-233 241-229	147-133	121-111	084-070	059-053	077-068 067-062	123	.082	.015	.030
0340	363							077	.238	.006	.013
0400	327							122	.098	.002	.000
0420	480							060	.033	.003	.007
0440	320	515-489 438-324 439-380	149-135 189-169 150-130	101-078	084-070	059-053	077-068 067-062	060	.047	.012	.024
0500	320							050	000	.000	.000
0520	400							040	000	.000	.000
0540	400							040	000	.000	.000
0600								040	000	.000	.000
0620	404							045	000	.000	.000
0640	413							041	000	.000	.000
0700	501							042	000	.000	.000
0720	583							046	.272	.131	.243
0740	353							050	.010	.021	.000
0800	586	515-489 438-324 439-380	149-135 189-169 150-130	101-078	084-070	059-053	077-068 067-062	043	.022	.015	.054
0820	575							043	.120	.020	.059
0840								042	.025	.000	.000
0900	358							043	000	.037	.026
0920	316	515-489 438-324 439-380	149-135 189-169 150-130	101-078	084-070	059-053	077-068 067-062	047	000	.019	.016
0940	369										

TABLE A.52 ROI-NAMUR TO KAUAI, BLUE GILL

1000 GMT 26 OCT.										
TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1000	426	341-260					045	.213	.000	.000
1020	321						040	000	.000	.000
1040	329						040	000	.000	.000
1100	341						040	000	.000	.000
1120	360	281-265					040	000	.000	.000
1140	266						040	000	.000	.000
1200	325						040	000	.000	.000
1220	307						040	.056	.000	.000
1240	277						040	000	.000	.000
1300	231						040	000	.000	.000
1320	206						040	000	.000	.000
1340							040	000	.000	.000
1400	216	158-149					040	000	.000	.000
1420	236						040	000	.000	.000
1440	236						042	000	.000	.000
1500	238						040	000	.000	.000
1520	248						042	000	.000	.000
1540	260						043	000	.000	.000
1600										
1620	140						040	000	.000	.000
1640	128						040	000	.000	.000
1700	109						041	000	.000	.000
1720	131						040	000	.000	.000
1740	171						040	069	.000	.000
1800	195						040	000	.000	.000
1820	230						047	000	.000	.000
1840	283						059	000	.000	.000
1900	307						064	000	.000	.000
1920	310	061	000	.000	.000					
1940	320	065	000	.000	.000					
2000	318	081	000	.000	.000					
2020	319	085	000	.000	.000					
2040	349	085	000	.000	.000					
2100	384	087	000	.000	.000					
2120	412	107	000	.000	.000					
2140	445	123	000	.000	.000					
						109	000	.000	.000	

TABLE A.52 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BGSD AVERAGE	SINGLE BGSD DAY
2200	328							111	000	.003	.000
2220	342							111	000	.000	.000
2240	455							117	.361	.000	.000
2300	414							115	.047	.000	.000
2320	432							111	.005	.000	.000
2340	326							126	.023	.000	.000
0000	329							123	.000	.000	.000
0020	454							131	.251	.000	.000
0040	430							125	.118	.000	.000
0100	391							129	.000	.000	.000
0120	397							123	.066	.000	.000
0140	414							226	.181	.000	.000
0200	336							125	.000	.000	.000
0220	432							109	.000	.053	.000
0240	464							106	.193	.005	.000
0300	432							087	.168	.000	.000
0320	368							097	.000	.000	.000
0340	425							097	.000	.000	.000
0400	407							083	.028	.000	.000
0420	327							073	.127	.000	.128
0440	349							075	.056	.000	.168
0500	341							062	.063	.000	.188
0520	336							045	.112	.109	.163
0540	315							045	.051	.154	.154
0600	351							040	.000	.000	.000
0620	349							040	.042	.000	.125
0640	385							041	.014	.000	.000
0700	521							042	.000	.000	.000
0720	470							041	.000	.000	.000
0740	452							040	.036	.000	.000
0800	317							040	.000	.000	.000
0820	302							040	.000	.000	.000
0840	319							040	.000	.000	.000
0900	302							040	.000	.000	.000
0920	304							040	.000	.000	.000
0940								040	.000	.000	.000

TABLE A.53 CANTON TO FAIRBANKS, BLUE GILL

1000 GRT 26 OCT.

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1000												.000
1020												.000
1040											.000	.000
1100											.000	.000
1120											.000	.000
1140											.000	.000
1200											.000	.000
1220											.000	.000
1240											.000	.000
1300											.000	.000
1320											.000	.000
1340											.000	.000
1400											.000	.000
1420											.000	.000
1440											.000	.000
1500											.000	.000
1520											.000	.000
1540											.000	.000
1600											.000	.000
1620											.000	.000
1640											.000	.000
1700											.000	.000
1720											.000	.000
1740											.000	.000
1800											.000	.000
1820											.000	.000
1840											.000	.000
1900											.000	.000
1920											.000	.000
1940											.000	.000
2000											.000	.000
2020											.000	.000
2040											.000	.000
2100											.000	.000
2120											.000	.000
2140											.000	.000

TIME	MOF	GAPS IN HF SPECTRUM	LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2200						.000
2220						.000
2240						.000
2300						.000
2320						.000
2340						.000
0000						.000
0020						.000
0040						.000
0100						.000
0120						.000
0140						.000
0200						.000
0220						.000
0240	183		124	000	.000	.000
0300	187		088	000	.000	.000
0320	183		074	000	.000	.000
0340	179		061	000	.000	.000
0400	150		053	000	.000	.000
0420	094		054	000	.000	.000
0440	065		043	000	.000	.000
0500	089		040	000	.028	.000
0520	079		040	000	.000	.000
0540	071		040	000	.000	.000
0600	040		040	000	.000	.000
0620	059		040	000	.000	.000
0640	092		040	000	.000	.000
0700	119		040	000	.000	.000
0720	082		040	000	.000	.000
0740	067		040	000	.000	.000
0800	069		040	000	.000	.000
0820	070		040	000	.000	.000
0840	080		040	000	.000	.000
0900	159		040	000	.072	.000
0920						.000
0940						.000

TABLE A.54 CANTON TO MIDWAY, BLUE GILL

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BMGD AVERAGE	SINGLE BMGD DAY
1000	178		163-147	140-134	126-094	087-079	076-070	066	.607	.567	.486
1020	216				123-094	087-070	076-070	055	.286	.476	.000
1040	228				121-108	099-092		055	.173	.392	.261
1100	040							040	.173	.309	.664
1120	211				127-091	064-060	075-070	056	.258	.363	.528
1140	175			127-110	102-091	084-079	064-058	054	.355	.382	.001
1200	179				121-070		065-058	055	.460	.404	.816
1220	220				121-072			054	.506	.445	.562
1240											.001
1300											.605
1320	201				176-070	063-060	063-059	055	.733	.285	.365
1340	137				131-071	063-060		041	.688	.510	.604
1400	138				120-096	084-070	066-079	056	.549	.526	.001
1420	138				127-081	073-070	063-060	043	.547	.386	.029
1440											.034
1500	132				124-070	062-058	062-059	040	.674	.531	.357
1520	134				104-094	084-080	072-070	053	.272	.101	.202
1540	128			120-114	094-090	080-068	061-077	046	.244	.388	.388
1600	132			124-112	102-092	079-070	062-060	047	.388	.285	.370
1620	094				083-070			040	.370	.238	.072
1640	074							040	.088	.351	.086
1700	094				084-072			040	.222	.136	.000
1720	134				102-094	083-070		051	.253	.000	.000
1740	138				094-079			062	.197	.062	.000
1800	231							080	.322	.036	.036
1820	256				079-070			063	.047	.202	.035
1840											.525
1900	277							084	.000	.040	.099
1920	267							085	.000	.070	.108
1940	304							096	.000	.094	.128
2000	275							086	.000	.168	.000
2020	317							107	.000	.227	.000
2040	333							116	.000	.211	.161
2100	347							104	.078	.232	.000
2120	386							106	.000	.117	.000
2140	302							115	.075	.148	.000

1000 GMT 26 OCT.

TABLE A.54 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY	BIKED AVERAGE	SINGLE BIKED DAY
2200	340						129	000	.000	.000
2220	314						127	.059	.037	.063
2300	275						126	000	.119	.000
2320	295						118	.181	.000	.000
2340	213						093	000	.000	.000
0000	289						116	.052	.038	.000
0020	255						125	.054	.264	.020
0040	264						111	.078	.000	.018
0100	308						105	.099	.061	.000
0120	316						115	000	.000	.019
0140	305						086	000	.116	.000
0200	369						076	.064	.103	.139
0220	316						080	000	.000	.103
0240	302						095	000	.046	.000
0300	324						095	.031	.024	.089
0320										.000
0340	296						063	000	.024	.000
0400	272						059	000	.020	.000
0420	338						051	.167	.004	.000
0500	321						047	000	.041	.013
0520	329						041	.260	.000	.000
0540	323						041	000	.005	.000
0600										.015
0620	319						040	.441	.112	.055
0640	206						047	000	.009	.053
0700	266						047	000	.139	.000
0720	250						047	.044	.176	.109
0740	227						048	.084	.228	.315
0800	231						047	.174	.333	.000
0820	238						040	.258	.288	.317
0840	238						055	.350	.265	.567
0900	209						042	.162	.433	.001
0920	211						042	.183	.422	.592
0940	207						069	.304	.324	.567

TABLE A.55 KAUAI TO WAKE, BLUE GILL

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	EMGD AVERAGE	SINGLE EMGD DAY
1000	318	252-231	191-134	123-111	162-104	062-060	079-073	063-061	.353	.256	.000
1020	283	252-240	182-153	120-115					.198	.269	.000
1040	295	251-239	158-154	147-115					.173	.411	.000
1100	313								.015	.166	.000
1120	310								.259	.203	.000
1140	316	268-232	165-151						.193	.095	.000
1200	400	367-194	161-150						.577	.000	.000
1220	134								.000	.294	.000
1240	321	286-210	157-149	139-131	123-109				.377	.153	.000
1300	093								.000	.309	.000
1320	078								.135	.307	.000
1340	071					063-060	064-059		.097	.142	.000
1400	068						062-059		.107	.059	.000
1420	067						054-051		.103	.041	.000
1440	062						062-058		.148	.072	.000
1500	062								.000	.268	.000
1520	058								.000	.045	.000
1540	058								.000	.062	.000
1600	068						062-059		.111	.056	.000
1620										.000	.000
1640	079								.088	.397	.000
1700	085							051-048	.000	.256	.000
1720	129							061-058	.122	.000	.000
1740	040						071-069		B	.000	.000
1800	040								B	.053	.000
1820	185								.719	.021	.000
1840	217					099-097			.600	.166	.449
1900	241					165-090			.071	.090	.190
1920	285	246-236	175-159	185-110					.517	.101	.151
1940	318	251-226	179-163	144-132					.235	.000	.000
2000	322	287-232	217-207	138-133					.382	.022	.000
2020	320	264-255	188-165	177-164					.194	.012	.000
2040	319		185-158	136-132	138-132				.138	.000	.000
2100	331		179-167						.132	.066	.000
2120	322								.061	.236	.000
2140	403								.000	.013	.091

1000 GRT 26 057.

TABLE A.55 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2200	120							193	.000	.003	.000
2220	324							197	.000	.003	.000
2240	324							199	.000	.017	.000
2300	325							199	.000	.101	.000
2320	309							141	.339	.000	.000
2340	321							220	.000	.000	.000
0000	320							124	.250	.121	.000
0020	320					155-149		140	.333	.105	.000
0040	298					204-161		124	.184	.086	.000
0100	322					220-160		112	.319	.133	.000
0120	320					190-158		118	.030	.079	.000
0140	314					215-148		109	.239	.153	.000
0200	321					150-144		126	.154	.158	.000
0220	324					208-159		117	.213	.080	.000
0240	320					178-159		112	.125	.074	.000
0300	317					221-177		111	.102	.060	.000
0320	318					186-160		104	.261	.062	.000
0340	310					210-189		099	.257	.104	.000
0400	313					212-159		073	.388	.114	.000
0420	301					242-158		063	.399	.097	.069
0440	312					238-158		062	.337	.100	.058
0500	310					222-161		046	.391	.043	.000
0520	146					251-160		040	.040	.015	.034
0540	254						098-094	040	.299	.003	.000
0600	261						107-095	040	.290	.000	.000
0620	232						100-094	041	.120	.049	.000
0640	233						100-096	040	.052	.151	.000
0700	254						100-095	040	.118	.071	.000
0720	289						102-096	040	.103	.072	.090
0740	310							040	.000	.044	.000
0800	312						098-090	040	.088	.035	.000
0820	311							040	.000	.045	.000
0840	318							040	.054	.171	.000
0900	309							040	.078	.203	.000
0920	309							040	.086	.169	.000
0940											

TABLE A.56 KAUAI TO MIDWAY, BLUE GILL

1000 GRT 26 OCT.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1000	092					076-061		053	.385	.143	.000
1020	074							040	.118	.165	.204
1040	074							040	.118	.410	.170
1100											.239
1120	077							042	.114	.145	.152
1140	073							042	.129	.172	.263
1200	085							041	.114	.211	.190
1220	089							041	.104	.215	.111
1240											.179
1300											.000
1320	057							041	.188	.266	.321
1340	059							040	.158	.124	.278
1400	065							040	.120	.112	.000
1420	120					076-065		040	.300	.278	.467
1440	065							040	.160	.118	.000
1500	073					098-088		040	.121	.083	.250
1520	070							040	.167	.294	.308
1540	057					064-062		040	.176	.105	.364
1600	061							040	.143	.252	.373
1620	045							040	.000	.126	.156
1640	061							040	.143	.183	.200
1700	072							040	.188	.159	.250
1720	093							047	.000	.083	.000
1740	112							051	.000	.049	.049
1800	260							106	.039	.083	.083
1820	141							054	.000	.033	.000
1840											.043
1900	152							048	.000	.079	.059
1920	172							055	.000	.046	.000
1940	235							057	.067	.053	.044
2000	261					094-088		055	.184	.026	.000
2020	271							062	.191	.125	.242
2040	287							062	.022	.023	.069
2100	274							063	.242	.184	.101
2120	274							071	.148	.104	.102
2140	296							071	.262	.061	.048

TABLE A.56 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2200	304		204-182	145-132	101-090			073	.199	.180	.060
2220											.000
2240	318		158-134					108	.114	.008	.075
2300	316							196	.258	.000	.024
2320	315	251-220	196-153					144	.409	.000	.000
2340	312	234-207	194-171	160-130				107	.259	.062	.187
0000	306		203-168	156-146				136	.265	.075	.225
0020	299	220-204	190-157					141	.310	.024	.000
0040	290		207-136					115	.406	.000	.000
0100	270		254-182	157-129	116-107			127	.634	.000	.000
0120	270		195-155	143-135				098	.072	.000	.074
0140	229	220-209	194-160		113-080			076	.578	.072	.013
0200	237		194-160		094-081			077	.416	.007	.013
0220	224		195-185		093-081			075	.156	.021	.015
0240	203							062	.094	.008	.017
0300	201		142-132					100	.273	.010	.018
0320	208					096-068			.000	.010	.000
0340											.021
0400	213							113	.000	.011	.023
0420	190				093-081			076	.175	.012	.034
0440	187			125-117				102	.000	.011	.032
0500	191				088-081			064	.055	.011	.000
0520	190							048	.000	.000	.140
0540	194				107-094		049-045	040	.111	.047	.031
0600	240						048-044	040	.020	.058	.117
0620	242						048-044	040	.000	.000	.034
0640	228		190-185				047-044	040	.090	.056	.341
0700	243	236-225	216-209				047-044	040	.103	.114	.179
0720	186						047-044	040	.027	.060	.000
0740	184						047-044	040	.021	.049	.528
0800	160		144-138	124-115	099-092		047-044	040	.208	.194	.079
0820	132			127-117	095-090		048-045	040	.196	.174	.000
0840	115							040	.000	.135	.000
0900	118							040	.000	.081	.000
0920	113							040	.000	.179	.000
0940	122				085-079		048-043	040	.134	.170	.000

TABLE A.57 CANTON TO HAWAII, BLUE GILL

1000 GMT 26 OCT.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	SKGD AVERAGE	SINGLE SKGD DAY
1000	400							041	000	.000	.000
1020	385							041	000	.000	.000
1040											.000
1100	358							041	000	.000	.000
1120	351							041	000	.016	.000
1140	306							041	000	.000	.000
1200	273							041	000	.010	.000
1220	251							041	000	.014	.000
1240	187							041	000	.000	.000
1300	141							043	000	.000	.000
1320	224							041	000	.012	.000
1340	217							041	000	.008	.000
1400	199							041	000	.000	.000
1420	215							040	000	.000	.000
1440	204							040	000	.077	.061
1500	199							041	000	.043	.118
1520											.300
1540											.133
1600											.000
1620											.215
1640	170										.021
1700	168							041	000	.133	.031
1720	195							043	000	.011	.000
1740	239							041	000	.032	.000
1800	303							046	000	.008	.000
1820								046	000	.008	.000
1840	324										.000
1900	328							051	000	.000	.000
1920	333							053	000	.000	.000
1940	320							057	000	.000	.000
2000	297							061	000	.004	.007
2020	291							067	000	.000	.000
2040	295							074	000	.000	.000
2100	307							074	018	.000	.000
2120	295							093	000	.000	.000
2140								081	000	.000	.000

TABLE A.57 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2200								062	000		.000
2220	359							103	000	.000	.000
2240	640							066	000	.000	.000
2300	401							063	000	.000	.000
2320	405							059	000	.000	.000
2340	385							059	000	.000	.000
0000	375							061	000	.000	.000
0020	357							053	000	.000	.000
0040	357							053	000	.000	.000
0100	375							056	000	.000	.000
0120	385							053	000	.000	.000
0140								056	000	.000	.000
0200								053	000	.000	.000
0220	423							047	000	.000	.000
0240	451							049	.005	.000	.000
0300	461							063	.111	.005	.010
0320	451							063	.062	.000	.000
0340	432							059	000	.003	.000
0400	383							045	000	.000	.000
0420	400							040	000	.000	.000
0440	420							040	000	.000	.000
0500	360							040	000	.000	.000
0520	340							040	000	.000	.000
0540	320							040	000	.000	.000
0600								042	000	.006	.000
0620	574							039	000	.000	.000
0640	633							039	000	.000	.000
0700	640							045	.003	.006	.000
0720	638							042	000	.000	.000
0740	638							046	000	.000	.000
0800	633							041	.005	.000	.000
0820	641							041	000	.010	.000
0840								041	000	.000	.000
0900	631							046	.000	.000	.000
0920	605										
0940	599										

TABLE A.58 CANTON TO TUTUILA, BLUE GILL

1000 GMT 26 OCT.

TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1000	280						040	.050	.000	.000
1020	184						040	.000	.000	.000
1040	173						040	.000	.000	.000
1100	177						040	.000	.036	.000
1120	173						040	.000	.000	.000
1140	224						040	.250	.000	.000
1200	397						040	.174	.159	.000
1220	237						040	.000	.000	.000
1240	308						040	.000	.000	.000
1300	274						040	.000	.000	.000
1320	297						040	.000	.010	.000
1340	187						040	.000	.022	.000
1400										
1420	273						040	.000	.334	.389
1440	231						040	.000	.000	.000
1500	318						040	.151	.003	.000
1520	188						040	.000	.059	.000
1540	238						040	.000	.108	.323
1600	238						040	.000	.000	.000
1620	299						040	.097	.000	.000
1640	251						040	.000	.000	.000
1700	230						043	.155	.000	.000
1720	203						041	.093	.000	.000
1740	232						040	.042	.000	.000
1800	236						040	.066	.049	.000
1820	229						040	.000	.035	.000
1840	230						041	.000	.000	.000
1900	235						040	.000	.047	.141
1920	235						040	.000	.076	.000
1940	255						040	.000	.000	.000
2000	233						040	.000	.000	.000
2020	269						040	.000	.000	.000
2040	266						040	.000	.000	.000
2100	241						040	.000	.090	.000
2120	243						040	.000	.000	.000
2140	276						040	.000	.000	.000

TABLE A.58 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2200	316	239-226						040	000	.000	.000
2220	269							040	000	.000	.000
2240	208							040	000	.000	.000
2300	210							040	000	.000	.000
2320	206							040	000	.000	.000
2340											
0000											
0020	221										
0040	226							040	000	.000	.000
0100	230							040	000	.000	.000
0120	251							040	000	.000	.000
0140	222							040	.062	.000	.000
0200	224							040	000	.000	.000
0220	259							040	000	.000	.000
0240	244							040	000	.000	.000
0300	246							040	000	.000	.000
0320	265							040	000	.000	.000
0340	252							040	000	.000	.000
0400	310							040	000	.000	.000
0420	308							040	000	.000	.000
0440	338							040	000	.000	.000
0500	392							040	000	.000	.000
0520	432							040	000	.000	.000
0540	480							040	000	.000	.000
0600	040							040	000	.000	.000
0620								040	B	.082	.163
0640	452							040	000	.122	.000
0700	467							040	000	.122	.244
0720	365							040	000	.000	.244
0740	451							040	000	.000	.000
0800	479							040	000	.152	.457
0820	552							040	000	.081	.242
0840	546							040	000	.057	.169
0900	625							040	000	.000	.000
0920	562							040	000	.070	.000
0940	443	398-379						040	.047	.106	.144
								040		.018	.000

TABLE A.59 ROI-NAMUR TO TUTUILA, BLUE GILL

1000 GMT 26 OCT.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1000	423							040	.010	.000	.000
1020	421							040	.005	.000	.000
1040	400							041	.000	.000	.000
1100	384							040	.023	.000	.000
1120	385							040	.000	.000	.000
1140	360							040	.000	.000	.000
1200	357							040	.000	.000	.000
1220	353							040	.000	.000	.000
1240	349							041	.000	.000	.000
1300	322							040	.000	.000	.000
1320	316							040	.000	.000	.000
1340	264							040	.000	.000	.000
1400								043	.000	.000	.000
1420	222							041	.000	.000	.000
1440	250							040	.000	.000	.000
1500	251							040	.000	.000	.000
1520	261							040	.018	.060	.000
1540	303							040	.030	.000	.000
1600	319							040	.000	.000	.000
1620	311							040	.000	.000	.000
1640	283							040	.000	.000	.000
1700	267							040	.013	.000	.000
1720	231							040	.000	.000	.000
1740	228							041	.021	.000	.000
1800	222							040	.121	.000	.000
1820	210							040	.129	.000	.000
1840	224							040	.092	.000	.000
1900	252							041	.014	.006	.000
1920											.000
1940	291							044	.012	.000	.000
2000	286							051	.000	.000	.000
2020	277							054	.000	.000	.000
2040	283							058	.000	.000	.000
2100	281							063	.023	.000	.000
2120	273							062	.014	.000	.000
2140	282							072	.000	.000	.000

TABLE A.59 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
2200	294	355-337						072	.012	.000	.000
2220	299							076	.000	.000	.000
2240	317							076	.000	.000	.000
2300	324							105	.000	.000	.000
2320	334							105	.000	.000	.000
2340	342	075-071						106	.000	.000	.000
0000											
0020	349							103	.000	.000	.000
0040	375							079	.000	.000	.000
0100	377							078	.000	.000	.000
0120	360							106	.000	.000	.000
0140	380							075	.000	.000	.000
0200	362							076	.000	.000	.000
0220	374							075	.000	.000	.000
0240	397							068	.000	.000	.008
0300	402	071-069						069	.000	.000	.000
0320	416							063	.000	.000	.000
0340	412							067	.000	.000	.000
0400	392							064	.000	.000	.000
0420	366							065	.003	.003	.006
0440	356							063	.007	.000	.000
0500	351							061	.000	.000	.000
0520	328							061	.000	.000	.000
0540	320							055	.000	.000	.000
0600	312							047	.000	.000	.000
0620		149-142									
0640	293							040	.000	.000	.000
0700	361							040	.000	.000	.000
0720	402							040	.000	.000	.000
0740	394							040	.000	.000	.080
0800	383							040	.052	.000	.000
0820	318							040	.000	.000	.000
0840	354							040	.036	.036	.108
0900	344							040	.089	.089	.266
0920	330							040	.024	.015	.046
0940	317							040	.036	.036	.000

TABLE A.60 ROI-NAMUR TO RAROTONGA, BLUE GILL

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1000	258		197-181	126-117	110-102	075-072	062-059	051-049	.133	.083	.000
1020	267		221-160	123-116	102-094	073-068	075-068	054-046	.379	.007	.000
1040	263		210-180	145-134	125-091	085-079	075-068	062-059	.309	.035	.000
1100	269	256-225	211-175	152-134	125-117	083-069	084-068	062-047	.627	.006	.000
1120	285		229-174		110-095	105-091	084-068	063-047	.500	.038	.000
1140	281	206-200	163-134		110-095	086-069	063-060	055-047	.326	.036	.000
1200	296	280-266	252-238	212-197	155-135	104-090	076-069	063-057	.357	.031	.000
1220	040								.128	.317	.000
1240	293			125-115	109-092	083-066	062-058	054-047	.201	.038	.000
1300	265				102-089	077-068	065-059		.090	.126	.000
1320	283					076-068	063-059		.084	.064	.000
1340	264	209-196							.081	.062	.000
1400											.000
1420											.000
1440	231		212-180		101-093	081-079	072-068	054-050	.262	.165	.000
1500	231	210-194				074-068	061-057		.142	.090	.000
1520	212						062-058		.025	.121	.045
1540	263	243-224				065-060			.128	.141	.032
1600											.026
1620	217										.000
1640	234								.000	.092	.000
1700	269								.016	.010	.000
1720	280	215-204			086-080	075-070			.000	.218	.000
1740	277								.093	.308	.000
1800	277	254-237	209-198		083-077	073-069			.000	.211	.000
1820									.209	.103	.037
1840	265					072-068			.050	.051	.299
1900	281				103-097				.030	.004	.000
1920	308			121-115	082-077				.021	.010	.000
1940					083-077						.000
2000	318								.025	.010	.000
2020	318								.000	.041	.000
2040	339								.000	.003	.009
2100	346								.000	.038	.000
2120	362								.000	.050	.000
2140	335								.000	.097	.000

1000 GMT 26 OCT.

TABLE A.60 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	8KGD AVERAGE	SINGLE 8KGD DAY
2200	433							099	000	.050	.000
2220	458							101	000	.000	.000
2240	426							102	000	.167	.000
2300											.000
2320											.000
2340											.006
0000	439							105	000	.000	.046
0020	459							092	000	.000	.000
0040	358							106	000	.000	.000
0100	432							092	000	.000	.000
0120	340							102	000	.005	.000
0140	441							105	000	.104	.213
0200	393							095	000	.000	.000
0220	354							099	000	.000	.000
0240	379							085	000	.000	.000
0300	399							105	000	.000	.000
0320	482							110	000	.293	.000
0400	449							110	000	.140	.000
0420	349							101	000	.163	.057
0440	402							085	000	.171	.095
0500	382							087	000	.084	.000
0520	372							087	000	.017	.000
0540											.000
0600	346							053	000	.000	.000
0620	351							042	000	.000	.000
0640	308							041	000	.067	.000
0700	299							040	.012	.027	.000
0720	299							040	000	.211	.000
0740											.000
0800											.000
0820											.000
0840	273							040	000	.012	.000
0900	217							040	.023	.026	.000
0920	261							040	000	.163	.027
0940	232							040	000	.048	.000

TABLE A.61 ROI-NAMUR TO HAWAII, KING FISH

TIME	MOF	GAPS IN HF SPECTRUM				LOF	EVENT DAY	120 GMT 1 NOV. BKGD AVERAGE	SINGLE BKGD DAY
1200	216					126	000	.110	.220
1220	167					063	.365	.150	.000
1240	139					043	000	.188	.071
1300	141					044	.052	.360	.280
1320	143					040	.068	.447	.391
1340	139					047	.174	.203	.447
1400	140					040	000	.194	.154
1420	141					047	000	.057	.257
1440	040					040	B	.435	.000
1500	040					040	B	.289	.579
1520	182					040	.014	.277	.504
1540	140					040	000	.055	.424
1600	141					040	000	.270	.053
1620	135					040	000	.248	.313
1640									.281
1700									.225
1720	134					045	.067	.058	.115
1740	139					044	.432	.060	.000
1800	181					121	000	.129	.015
1820	254					048	.029	.022	.000
1840	277					055	000	.000	.000
1900	277					061	000	.000	.000
1920	301					061	000	.000	.000
1940	317					065	000	.037	.000
2000	337					067	.185	.005	.006
2020	321					074	000	.147	.000
2040	304					098	000	.024	.000
2100	302					098	000	.055	.000
2120	326					098	000	.000	.000
2140	336					098	000	.009	.000
2200	350					107	000	.023	.000
2220	376					096	000	.000	.017
2240	399					096	000	.013	.000
2300	407					097	000	.000	.027
2320	422					089	000	.000	.000
2340	430						000	.046	.138

TABLE A.61 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	399							087	000	.014	.000
0020	414							090	000	.212	.228
0040	394							074	000	.152	.106
0100	410							066	.012	.073	.195
0120	407							069	.047	.025	.170
0140	407							065	.061	.036	.046
0200	348							065	000	.056	.127
0240	352							065	.042	.072	.041
0300	339							062	.058	.197	.216
0320	403							062	.012	.199	.321
0340	422							063	000	.032	.070
0400	440							064	.005	.106	.084
0420	436							065	.008	.187	.379
0440	461							045	000	.115	.344
0500	546							044	.119	.153	.287
0520	339							041	000	.000	.000
0540								040	000	.004	.000
0600	338							040	000	.008	.000
0620	353							040	000	.011	.033
0640	341							040	000	.044	.088
0700	337							040	000	.036	.108
0720	337							040	000	.012	.022
0740	322							040	000	.051	.000
0800	274							040	000	.048	.000
0820	292							040	000	.122	.000
0840	172							040	000	.086	.077
0900	248							040	000	.197	.180
0920	254							040	000	.147	.000
0940	239							040	000	.266	.308
1000	240							043	000	.307	.298
1020	247							040	000	.140	.000
1040	255							044	000	.136	.145
1100	268							040	000	.144	.154
1120	276							040	000	.138	.000
1140	265							040	000		

TABLE A.62 ROI-NAMUR TO KAUAI, KING FISH

1230 GMT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	130	172-128					040	000	.000	.000
1220	204						123	000	.000	.000
1240	200						040	.275	.000	.000
1300	137						040	000	.000	.000
1320	140	074-063					040	000	.000	.000
1340	140						040	.160	.000	.000
1400	132						040	.022	.000	.000
1420	137						040	000	.000	.000
1440	140	049-044 044-042					040	000	.000	.000
1500	137						040	000	.000	.000
1520	140						040	000	.000	.000
1540	133						040	000	.000	.000
1600	131						040	000	.000	.000
1620	580						040	000	.000	.000
1640	191						040	000	.000	.000
1700	268						040	000	.000	.000
1720	264						047	000	.000	.000
1740	304						059	000	.000	.000
1800	310						065	000	.000	.000
1820	278						072	000	.000	.000
1840	296						073	000	.000	.000
1900	317						083	000	.000	.000
1920	355						086	000	.036	.000
1940	373						097	000	.000	.000
2000							096	000	.017	.000
2020							111	000	.000	.000
2040										
2100										
2120										
2140										
2200										
2220										
2240										
2300										
2320										
2340										

TABLE A.62 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	400		350-309	146-141				104	.155	.027	.000
0020	402							110	.000	.000	.000
0040											.000
0100	409	387-361	343-310					105	.194	.000	.000
0120	408		375-309					107	.219	.003	.000
0140											.000
0200	410		332-317					106	.049	.000	.000
0220	297							082	.000	.000	.000
0240											.000
0300	396	355-326						078	.091	.000	.000
0320	393							074	.009	.000	.000
0340											.000
0400	467		428-308					061	.296	.000	.000
0420	476		423-310					054	.268	.000	.000
0440											.000
0500	484							040	.173	.000	.000
0520	419	430-353	316-303					040	.166	.000	.000
0540		397-347									.000
0600	384							040	.000	.000	.000
0620	397							040	.000	.000	.000
0640											.000
0700	381							040	.000	.000	.000
0720	372		286-274					040	.036	.000	.000
0740											.000
0800	322							040	.000	.000	.000
0820	287							040	.000	.000	.000
0840											.000
0900	223							040	.000	.000	.000
0920	224							040	.000	.000	.000
0940											.000
1000	232							040	.000	.000	.000
1020	231							040	.000	.000	.000
1040											.000
1100	250							040	.000	.000	.000
1120											.000
1140											.000

TABLE A.63 CANTON TO FAIRBANKS, KING FISH

1230 OCT 1 1977.

TIME	MOF	GAPS IN HF SPECTRUM				LOF	EVENT DAY	0460 AVERAGE	SINGLE BRID DAY
1200	078					040	000	.000	.000
1220	077					048	.621	.000	.000
1240	068					041	000	.000	.000
1300	040					040	B	.000	.000
1320	040					040	B	.000	.000
1340	040					040	B	.000	.000
1400	040					040	B	.000	.000
1420	040					040	B	.000	.000
1440	040					040	B	.000	.000
1500	040					040	B	.000	.000
1520	067					041	000	.000	.000
1540	067					042	000	.000	.000
1600	074					043	000	.000	.000
1620	071					040	000	.000	.000
1640	071					040	000	.000	.000
1700	073					040	000	.011	.000
1720	147					040	.047	.000	.000
1740	152					064	.006	.000	.000
1800	198					107	000	.000	.000
1820	195					106	000	.000	.000
1840	219					126	000	.000	.000
1900	198					125	000	.000	.000
1920	235					130	000	.000	.000
1940						143	000	.000	.000
2000	253					146	000	.000	.000
2020	262					155	000	.023	.000
2040	238					171	000	.000	.000
2100	242					171	000	.000	.000
2120						171	000	.000	.000
2140	237					174	000	.000	.000
2200	237					163	000	.013	.000
2220	308					151	.314	.000	.000
2240	270				290-246	197	000	.026	.000
2300	269					132	000	.065	.196
2320	239					142	000	.000	.000
2340	244						000	.000	.000

TABLE A.63 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	SKGD AVERAGE	SINGLE BKGD DAY
0000	260							142	000	.000	.000
0020	275							133	000	.000	.000
0040	276							127	000	.000	.000
0100	279							103	000	.000	.000
0120	280							124	000	.000	.000
0140	300							124	000	.000	.000
0200	245							125	000	.040	.000
0220	227							126	000	.000	.000
0240	207							152	000	.000	.000
0300	179							106	000	.000	.000
0320	179							102	000	.000	.000
0340	153							061	065	.000	.000
0400	174							058	000	.000	.000
0420										.000	.000
0440										.000	.000
0500										.000	.000
0520										.000	.000
0540										.000	.000
0600										.000	.000
0620										.000	.000
0640										.000	.000
0700	090							040	000	.041	.000
0720	075							040	000	.381	.000
0740	069							043	000	.167	.000
0800	074							040	000	.037	.000
0820										.000	.000
0840	078							055	000	.011	.000
0900	077							040	000	.011	.000
0920	105							041	000	.000	.000
0940	040							040	B	.028	.000
1000										.000	.000
1020	108							040	000	.000	.000
1040	135							040	.021	.056	.000
1100	129							040	.112	.000	.000
1120	116							040	000	.000	.000
1140	088							040	.042	.000	.000

TABLE A.64 CANTON TO MIDWAY, KING FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	040							040	B	.229	.000
1220	199							066	.165	.324	.000
1240	090							040	.460	.328	.000
1300	040							040	B	.071	.000
1320	088							055	.727	.286	.591
1340										.144	.617
1400	088							083	000	.544	.674
1420											.357
1440	090							056	.529	.348	.302
1500	103							054	.204	.332	.000
1520											.400
1540	099							053	.500	.531	.172
1600	115							051	.234	.220	.000
1620	111							048	.365	.398	.000
1640	109							046	.159	.417	.235
1700	113							040	.493	.480	.275
1720	087							057	.333	.299	.044
1740	116							055	.311	.353	.333
1800										.056	.075
1820	259							081	.253	.182	.100
1840	281							117	.000	.153	.108
1900	235							096	.000	.095	.090
1920	223							081	.028	.106	.052
1940	293							082	.171	.052	.138
2000	306							058	.081	.096	.043
2020	256							079	.435	.054	.066
2040	270							058	.019	.000	.000
2100	282							060	.113	.039	.101
2120	279							058	.235	.080	.079
2140	293							063	.083	.006	.000
2200	295							065	.039	.064	.101
2220	289							069	.073	.094	.094
2240	312							063	.056	.224	.238
2300	317							111	.131	.215	.198
2320	262							112	.067	.120	.059
2340	260							125	.185	.083	.067

D-3670-441

TABLE A.64 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000								116	.128	.050	.023
0020	303	230-215	187-178	156-151	108-104			098	.191	.079	.084
0040	344	249-206	190-181	189-181				112	.093	.077	.169
0100	348	314-306	235-216					115	.199	.023	.118
0120	306	258-247	189-179					127	.057	.000	.067
0140	303		193-176					117	.160	.007	.000
0200	304	233-220						107	.000	.000	.000
0220	239							117	.110	.000	.000
0240	244							117	.000	.000	.000
0300	264		189-175					104	.056	.000	.000
0320	283		189-180					092	.000	.000	.000
0340	243		189-179					084	.063	.000	.000
0400	265							078	.000	.000	.000
0420	403							078	.000	.000	.000
0440	317							062	.000	.000	.000
0500	345							057	.000	.000	.000
0520									.000	.000	.000
0540	257		158-148					052	.000	.000	.000
0600	214				101-090			041	.156	.046	.091
0620	227							040	.027	.031	.063
0640	176							040	.051	.007	.014
0700	134							041	.065	.076	.152
0720	153							041	.098	.009	.019
0740	275							040	.153	.030	.061
0800	250	248-238	164-153	140-136	082-078	064-057		041	.344	.032	.041
0820	129	219-198	163-153		118-109	082-073		049	.550	.105	.195
0840	190				125-105	065-057		055	.756	.105	.109
0900	229		168-130		124-105	063-057		051	.287	.106	.319
0920	190		199-178		124-109	082-077		054	.257	.061	.184
0940	040		140-135			082-077		040	B	.024	.000
1000	233				125-108	082-068		050	.230	.121	.205
1020	228				129-107	082-077		051	.203	.095	.122
1040	235				124-107	082-073		049	.194	.188	.295
1100	243				124-107	082-077		050	.181	.095	.000
1120	276			125-116	082-077	062-057		050	.084	.436	.000
1140	223			121-110	084-077	062-060		050	.133	.200	.263

TABLE A.65 KAUAI TO WAKE, KING FISH

1210 GMT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	099							067 040	.063 B	.099 .049	.000
1220	040										.043
1240											.000
1300											.125
1320											.000
1340											.000
1400											.000
1420											.000
1440											.000
1500											.000
1520											.000
1540											.000
1600											.000
1620											.000
1640											.000
1700											.067
1720											.000
1740											.000
1800											.000
1820											.077
1840											.081
1900											.023
1920											.266
1940											.009
2000											.155
2020											.000
2040	040	222-199						040 182 165 162 166	B .202 000 000 000	.008 .003 .000 .163 .233	.007
2100	296										.007
2120	230										.007
2140	294										.000
2200	304										.326
2220	326										.211
2240	164										.285
2300	318										.124
2320	318										.103
2340	317										.135
		306-275						173 046 167 214 229	.203 .059 .132 000 000	.124 .103 .135 .128 .127	.000
											.000
											.000
		220-200									.000
											.000
											.000

TABLE A.65 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	322							227	000	.069	.096
0020	040							040	B...	.065	.000
0040	303							251	000	.034	.000
0100	328							124	.230	.000	.000
0120	323							108	000	.000	.000
0140	321							111	000	.000	.011
0200	296							110	000	.007	.126
0220	317							097	000	.007	.000
0240	327							071	000	.012	.000
0300	383							068	000	.000	.000
0320	318							065	000	.000	.000
0340	320							060	000	.020	.000
0400	320							059	000	.119	.007
0420	320							060	000	.092	.000
0440	320							058	000	.009	.008
0500	317						098-091	057	.027	.035	.000
0520	318						107-101	047	.000	.037	.010
0540	275							040	.026	.050	.009
0600	261							040	000	.033	.000
0620	232							040	000	.015	.000
0640	238							040	000	.091	.279
0700	239					179-160		040	.095	.052	.000
0720	202							040	000	.045	.186
0740	196							040	000	.017	.073
0800	204							040	000	.005	.000
0820	240							040	000	.012	.000
0840	241							040	000	.025	.000
0900	236							040	000	.046	.127
0920	256							040	.106	.061	.167
0940	487							040	.546	.037	.000
1000	522							049	.577	.023	.000
1020	539							040	.281	.032	.000
1040	640							051	.200	.022	.000
1100											.000
1120	562							040	.397	.047	.000
1140											.000

TABLE A.66 KAUAI TO MIDWAY, KING FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	058							041	.176	.013	.000
1220	135							052	.120	.043	.000
1240	116							040	.171	.042	.000
1300	113							100	.162	.199	.000
1320	067							051	.313	.094	.148
1340	089							040	.129	.045	.085
1400	160							040	.325	.081	.128
1420											.238
1440	158							040	.059	.114	.208
1500											.074
1520											.000
1540	147							052	.126	.107	.000
1600	139							048	.093	.067	.056
1620											.000
1640	136							040	.135	.044	.000
1700	121							040	.136	.106	.091
1720	128							058	.000	.310	.435
1740	154							083	.000	.041	.000
1800											.000
1820	212							094	.136	.060	.040
1840	208							110	.296	.116	.142
1900	225							120	.101	.034	.034
1920	241							121	.276	.103	.027
1940	223							122	.228	.036	.031
2000	162							079	.000	.180	.000
2020	174							053	.000	.115	.094
2040	160							059	.066	.000	.000
2100	112							057	.164	.037	.000
2120	151							081	.000	.188	.098
2140											.010
2200	100							050	.000	.038	.000
2220	105							077	.000	.043	.038
2240											.162
2300	303							077	.527	.056	.071
2320	297							070	.573	.054	.037
2340	308							073	.574		.000

TABLE A.66 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	178		242-233	218-178	145-127			108	000	.057	.000
0020	271			249-179	145-129			114	.471	.028	.26
0040	288				139-129			106	.538	.065	.09
0100	147				141-135			095	.192	.085	.071
0120	200			183-161				095	.267	.024	.070
0140	146							141	000	.009	.000
0200	158							109	000	.028	.056
0220	259			189-160	143-134			123	.279	.016	.000
0240	256			229-158				142	.623	.013	.017
0300	258							117	000	.007	.000
0320											
0340	199							079	.142	.000	.000
0400	171							067	.106	.006	.013
0420	180				141-128			063	.111	.000	.000
0440	194							051	.098	.000	.000
0500	231		221-204	189-175				047	.201	.000	.000
0520											
0540	236		285-276							.081	.081
0600	296							040	.059	.014	.014
0620	240							040	.045	.023	.023
0640	211							040	.099	.149	.219
0700	175							040	.037	.057	.089
0720	199							040	.089	.136	.000
0740	175							040	.081	.081	.187
0800	155							040	.035	.077	.336
0820	159							040	.188	.055	.134
0840	159							040	.084	.045	.198
0900	157							041	.190	.055	.168
0920	156							041	.235	.074	.211
0940	159							041	.119	.086	.067
1000	160							041	.235	.029	.078
1020	154							040	.193	.035	.000
1040	180							040	.100	.050	.000
1100	172							041	.031	.023	.000
1120	148			169-155				040	.074	.032	.000
1140	154							040	.044	.120	.000

TABLE A.67 CANTON TO HAWAII, KING FISH

1210 GMT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	183							041	.148	.180	.000
1220	193							041	.000	.194	.000
1240	331							040	.052	.216	.076
1300	093							040	.000	.244	.173
1320	139							040	.131	.251	.293
1340	219							040	.000	.222	.191
1400	173							040	.000	.126	.053
1420	177							040	.000	.137	.000
1440	172							040	.000	.124	.124
1500										.100	.100
1520										.041	.041
1540	218							040	.056	.156	.033
1600	205							040	.036	.120	.187
1620	156							040	.069	.093	.104
1640	140							040	.000	.104	.122
1700										.047	.047
1720	217							047	.000	.073	.000
1740	252							044	.000	.029	.049
1800	265							052	.028	.030	.041
1820	272							057	.028	.012	.037
1840	278							063	.023	.000	.000
1900	277							065	.061	.000	.000
1920	270							068	.000	.000	.000
1940	278							069	.024	.000	.000
2000	274							082	.000	.000	.000
2020	271							080	.000	.000	.000
2040	267							087	.000	.000	.000
2100	259							083	.000	.000	.000
2120	266							088	.000	.000	.000
2140	276							087	.000	.000	.000
2200	281							088	.000	.000	.000
2220	293							053	.000	.000	.000
2240	292							054	.054	.000	.000
2300	297							093	.000	.000	.000
2320	302							060	.000	.000	.000
2340	302								.079	.000	.000

TABLE A.67 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	306							056	.016	.000	.000
0020	307							047	000	.000	.000
0040	337							053	000	.003	.000
0100	336							041	000	.012	.000
0120	337							053	.014	.014	.000
0140	336							041	000	.000	.000
0200	355							041	000	.000	.000
0220	376							044	000	.002	.000
0240	383							041	000	.006	.000
0300	381							041	000	.014	.000
0320	397							042	000	.030	.000
0340	412							041	000	.022	.000
0400	436							041	000	.008	.000
0420	452							041	000	.000	.000
0440	458							041	000	.012	.000
0500	442							041	000	.000	.000
0520											
0540											
0600	339							040	000	.000	.000
0620	355							040	000	.000	.000
0640	356							040	000	.000	.000
0700	301							040	000	.000	.000
0720	304							040	.080	.010	.000
0740	287							040	.053	.000	.000
0800	348							040	000	.038	.000
0820	337							040	000	.021	.000
0840	323							040	.060	.068	.073
0900	336							040	000	.078	.131
0920											
0940	040							040	B	.05	.000
1000	346							040	000	.060	.048
1020	368							040	000	.097	.121
1040	345							040	000	.153	.126
1100	385							040	000	.191	.122
1120	414							040	000	.198	.213
1140	383							040	000	.169	.233

TABLE A.68 CANTON TO WAKE, KING FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	251							081	000	.167	.000
1220	254							078	000	.114	.000
1240	196							082	.272	.096	.017
1300	125							047	.397	.034	.040
1320	087										.039
1340	087							082	000	.016	.035
1400	095							081	000	.070	.097
1420	040							040	B	.069	.000
1500	105									.037	.000
1520	153							081	000	.009	.000
1540	160							064	.326	.081	.071
1600	040							065	.326	.108	.000
1620								040	B	.048	.058
1640	109									.067	.079
1700	040							081	B	.100	.000
1720	194							040	.430	.100	.000
1800	231							115	.131	.120	.000
1820	265							101	000	.148	.224
1840	294							111	000	.000	.000
1900	286							107	000	.000	.000
1920	291							084	000	.000	.000
1940	307							100	000	.000	.000
2000	297							083	000	.000	.000
2020	294							124	000	.000	.000
2040	288							113	000	.009	.000
2100	280							124	.030	.009	.000
2120	270							114	000	.000	.000
2140	256							114	000	.000	.000
2200	254							117	000	.052	.104
2220	247							115	000	.000	.000
2240	246							113	000	.000	.000
2300	247							125	000	.000	.000
2320	260							127	000	.004	.000
2340								121	000	.000	.000

1210 GMT 1 NOV.

TABLE A.68 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	273							116	000	.018	.000
0020	275							112	000	.000	.000
0040	285							103	000	.000	.000
0100	293							074	000	.000	.000
0120	278							077	000	.000	.000
0140	282							074	000	.000	.000
0200	271							067	000	.004	.000
0220	283							076	000	.000	.000
0240	292							076	000	.017	.000
0300	306							075	000	.000	.000
0320	310							069	000	.000	.000
0340	332							066	000	.003	.000
0400	345							062	000	.007	.000
0420	368							053	000	.034	.000
0440	376							049	000	.057	.000
0500	385							045	000	.103	.081
0520	361	317-304						040	050	.080	.150
0540	369	341-303						040	.116	.006	.000
0600	364	317-275						040	.216	.015	.000
0620	257							040	000	.021	.000
0640	237							040	000	.129	.000
0700	305	246-228						040	.068	.087	.000
0720	295	254-229						045	.100	.036	.000
0740											.000
0800	167							046	.364	.057	.010
0820	160							046	.158	.027	.000
0840	143							063	.450	.025	.000
0900	144							063	.173	.011	.012
0920	284	212-197						050	.269	.017	.000
0940											.000
1000	230							057	.295	.046	.000
1020	256							062	.345	.079	.148
1040	257							123	.246	.090	.038
1100	242							184	000	.094	.183
1120	290							080	.290	.089	.000
1140	294	209-197						123	000	.130	.034

TABLE A.69 CANTON TO VITI LEVU, KING FISH

1210 OCT 1 2007

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	260							041	000	.000	.000
1220	333							040	000	.000	.000
1240	274							040	000	.013	.000
1300	459							040	000	.028	.056
1320	563							040	000	.050	.087
1340	363							040	000	.036	.144
1400	319							040	000	.026	.106
1420	333							041	000	.028	.033
1440	319							040	000	.009	.014
1500	320							040	000	.034	.136
1520	302							040	000	.078	.188
1540	252							040	000	.000	.000
1600	206							040	000	.127	.237
1620	191							040	000	.045	.128
1640	173							040	000	.007	.022
1700	154							040	000	.085	.187
1720	167							040	000	.041	.129
1740	169							040	000	.053	.101
1800	195							040	000	.000	.046
1820											.000
1840	224							040	000	.028	.050
1900	233							040	000	.007	.027
1920	223							040	000	.025	.096
1940	221							040	000	.004	.017
2000	213							040	000	.018	.072
2020	208							040	000	.000	.000
2040											.000
2100	228							040	000	.000	.000
2120											.000
2140	255							040	000	.000	.000
2200	252							054	.014	.000	.000
2220	262							049	000	.000	.000
2240	286							049	000	.000	.000
2300	317							056	000	.000	.000
2320	304							040	000	.000	.000
2340	305							041	000	.000	.000

TABLE A.69 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BGD AVERAGE	SINGLE BGD DAY
0000	333								046	000	.000	.000
0020	311								040	000	.000	.000
0040	335								040	000	.000	.000
0100	317								040	000	.000	.000
0120	306								040	000	.000	.000
0140	317								045	000	.000	.000
0200	298								040	000	.000	.000
0220												
0240	307								040	000	.000	.000
0300	311								040	000	.000	.000
0320	316								040	000	.000	.000
0340	334								040	000	.000	.000
0400	323								040	000	.000	.000
0420												
0440	370								040	000	.000	.000
0500	353								040	000	.000	.000
0520	317								040	000	.000	.000
0540	277								040	000	.000	.000
0600	237								040	000	.000	.000
0620	291								040	000	.000	.000
0640	315								040	000	.000	.000
0700	277								040	000	.000	.000
0720	278								040	000	.072	.215
0740	240								040	000	.007	.019
0800	227								040	000	.011	.033
0820	247								040	000	.012	.041
0840									040	000	.027	.067
0900	269								040	000	.022	.000
0920	262								040	000	.039	.051
0940												
1000	260								040	000	.135	.036
1020	199								040	000	.000	.273
1040	255								040	000	.000	.000
1100	249								040	000	.000	.000
1120	220								040	000	.000	.000
1140	227								040	000	.000	.000

TABLE A.70 CANTON TO TUTUILA, KING FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	1210 GMT 1 NOV.	
											BKGD	SINGLE BKGD DAY
1200	596							039	000	.000	.000	.000
1220	407							040	000	.059	.104	.104
1240	315							040	.080	.024	.121	.121
1300	366							040	.064	.074	.000	.000
1320	342							040	000	.027	.080	.080
1340	293							040	000	.021	.000	.000
1400												
1420	288							041	000	.054	.179	.179
1440	316							040	000	.079	.054	.054
1500	301							040	000	.049	.000	.000
1520	320							040	.207	.013	.000	.000
1540	223							040	000	.114	.343	.343
1600	225							040	.016	.163	.385	.385
1620	216							040	000	.010	.029	.029
1640												
1700	228							040	000	.000	.000	.000
1720	214							040	.052	.018	.036	.036
1740	234							040	000	.131	.000	.000
1800	231							040	000	.055	.000	.000
1820	224							040	000	.000	.000	.000
1840	226							040	000	.000	.000	.000
1900	374							041	000	.012	.000	.000
1920	283							040	000	.000	.000	.000
1940	334							041	000	.045	.000	.000
2000	305							041	000	.000	.000	.000
2020	335							040	000	.041	.000	.000
2040	470							041	000	.000	.000	.000
2100	432							041	000	.046	.000	.000
2120	521							041	000	.000	.000	.000
2140	550							041	000	.000	.000	.000
2200	562							041	000	.015	.000	.000
2220												
2240	397							042	000	.000	.000	.000
2300	225							041	000	.000	.000	.000
2320	307							041	000	.000	.000	.000
2340	206							040	000	.000	.000	.000

TABLE A.70 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	237							040	000	.040	.120
0020	268							040	000	.000	.000
0040	272							040	000	.025	.000
0100											.000
0120	319							040	000	.022	.000
0140	273							040	.090	.000	.000
0200	297							040	000	.020	.000
0220	310							040	000	.000	.000
0240	261							040	.127	.000	.000
0300	238							040	000	.000	.000
0320	245							040	000	.000	.000
0340	320							040	000	.000	.000
0400	259							040	000	.000	.000
0420	268							040	000	.000	.000
0440	251							040	000	.000	.000
0500	234							040	000	.000	.000
0520	201							040	000	.000	.000
0540	250							040	000	.000	.000
0600	236							040	000	.000	.000
0620	155							040	.229	.000	.000
0640	195							040	000	.000	.000
0700	200							040	000	.000	.000
0720	137							040	000	.000	.000
0740	138							040	000	.000	.000
0800	140							040	000	.000	.000
0820	150							040	000	.000	.000
0840	165							040	000	.084	.168
0900	176							040	000	.011	.057
0920	182							040	000	.025	.031
0940	040							040	000	.041	.107
1000	158							040	000	.041	.164
1020								040	B 000	.066	.217
1040	156							040	000	.025	.049
1100	159							040	000	.011	.112
1120	158							040	000	.050	.000
1140	146							041	000	.008	.083
								041	000	.010	.000

TABLE A.71 CANTON TO RAROTONGA, KING FISH

1210 OCT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BAKED AVERAGE	SINGLE BAKED DAY
1200	224	403-378 404-371 405-367	213-198					042	000	.080	.000
1220	293							041	.060	.170	.000
1240	194							041	000	.160	.000
1300	363							040	000	.266	.185
1320	163							040	.009	.374	.395
1340	447	074-070 072-070 072-070 081-078	073-070					043	.067	.179	.195
1400	448							040	.086	.338	.171
1420	425							040	.114	.224	.329
1440	361							040	000	.408	.218
1500	315							040	000	.321	.325
1520	243	075-070	075-069					040	000	.191	.080
1540	247							040	.029	.230	.286
1600	271							040	.022	.225	.364
1620	192							044	.020	.170	.208
1640	230							042	000	.152	.270
1700	239	067-056						040	000	.045	.077
1740	235							056	000	.013	.089
1800	273							042	000	.000	.039
1820	311							043	.041	.000	.000
1840	318							046	000	.000	.000
1900	359	061-046						054	000	.000	.000
1920	317							042	000	.000	.000
1940	312							056	000	.000	.000
2000	302							057	000	.000	.000
2020	307							053	000	.000	.000
2040	318	299-271						052	.105	.000	.000
2100	318							052	000	.000	.000
2120	313							052	000	.000	.000
2140	325							042	.055	.000	.000
2200	350							061	000	.000	.000
2220	347	067-056						061	000	.000	.000
2240	360							063	000	.000	.000
2300	367							068	000	.000	.000
2320	357							065	000	.000	.000
2340	357							065	000	.000	.000

TABLE A.71 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	358							062	000	.000	.000
0020	359							061	000	.000	.000
0040	349							052	000	.000	.000
0100	366							053	006	.000	.000
0120	365							051	.010	.000	.000
0140	367							041	000	.089	.000
0200	362							041	.016	.000	.000
0240	382							041	000	.003	.000
0300	397							042	000	.108	.000
0320	404							041	000	.008	.000
0340	416							041	000	.003	.000
0400	432							042	000	.030	.034
0420	408							040	000	.015	.026
0440	368							040	000	.020	.040
0500	336							041	000	.018	.035
0520	270							040	000	.000	.000
0540								040	000	.000	.000
0600	231							040	000	.014	.000
0620	224							040	000	.028	.000
0640	220							040	000	.068	.122
0700	220							041	000	.056	.059
0720	266							043	000	.200	.037
0740	269							042	000	.145	.290
0800	277							040	000	.117	.117
0820	167							041	000	.216	.309
0840	272							043	000	.154	.292
0900	278							040	.017	.057	.114
0940								040	000	.128	.128
1000	267							040	000	.125	.148
1020	274							040	000	.178	.193
1040	280							040	000	.247	.000
1100	314							040	000	.036	.000
1120											.000
1140											.035

TABLE A.72 ROI-NAMUR TO TUTUILA, KING FISH

1210 GMT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	277	156-150	074-071	115-096	072-069	076-068		040	000	.050	.000
1220	384							040	000	.029	.019
1240	317							040	000	.036	.000
1320	259							040	.014	.089	.000
1340										.147	.000
1400	252	156-150	074-071	115-096	072-069	076-068		040	.090	.000	.102
1420	221							040	.033	.039	.000
1440	215							040	000	.000	.000
1500	212							040	000	.199	.000
1520	183							040	000	.044	.133
1540	172							040	000	.048	.088
1600	157							040	.026	.006	.037
1620										.000	.012
1640	140							040	000	.064	.000
1700	148							040	000	.025	.000
1720	171	156-150	074-071	115-096	072-069	076-068		040	.053	.038	.000
1740	191							040	000	.022	.000
1800	221							041	000	.187	.000
1820	242							041	000	.083	.000
1840	263							041	000	.000	.000
1900	267							041	000	.000	.000
1920	268							041	000	.000	.000
1940	273							041	000	.000	.000
2000	267							041	000	.000	.000
2020	257							041	000	.000	.000
2040	237	156-150	074-071	115-096	072-069	076-068		056	000	.000	.000
2100	232							070	000	.000	.000
2120	229							063	000	.000	.000
2140	232							061	000	.014	.000
2200	235							067	000	.101	.032
2220										.000	.000
2240	231							067	000	.000	.000
2300	237							067	000	.000	.000
2320	249							066	000	.000	.000
2340	272							064	000	.000	.000

TABLE A.72 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	DKSD AVERAGE	SINGLE DKSD DAY
0000	286							072	000	.000	.000
0020	294							068	000	.025	.000
0040	299							067	000	.009	.000
0100	308							066	000	.003	.008
0120											.000
0140											.000
0200	320							062	000	.000	.000
0220	354							066	000	.001	.000
0240	360							064	000	.005	.000
0300	379							060	000	.004	.000
0320	391							055	000	.002	.000
0340	388							053	000	.000	.000
0400	398							045	000	.005	.000
0420	410							043	000	.000	.000
0440	389							040	000	.002	.000
0500	375							040	000	.000	.000
0520	344							040	000	.000	.000
0540	300							040	000	.000	.000
0600	276							040	000	.000	.000
0620	262							040	000	.000	.000
0640	242							040	000	.000	.000
0700	235							040	000	.000	.000
0720	230							040	000	.000	.000
0740	212							040	000	.000	.000
0800	184							040	000	.044	.092
0820	232							040	000	.009	.000
0840	231							040	000	.000	.000
0900	233							040	000	.021	.000
0920	231							040	000	.012	.000
0940								040	000	.083	.000
1000	311									.034	.000
1020								066	000	.007	.000
1040	249							040	000	.008	.059
1100	314							040	000	.021	.021
1120	275							040	000	.045	.189
1140	278							040	000	.033	.073
									000	.027	.000

TABLE A.73 ROI-NAMUR TO VITI LEVU, KING FISH

1210 GMT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	226							042	000	.016	.066
1220	212							040	000	.011	.033
1240	201							040	000	.122	.000
1300	289							040	000	.097	.043
1320	238							040	000	.100	.037
1340	298							040	.186	.159	.017
1400	223							040	000	.089	.043
1420	189							040	000	.074	.053
1440	213							040	000	.102	.031
1500	188							040	000	.015	.046
1520	175							040	000	.041	.124
1540	150							040	000	.102	.144
1600											.128
1620	149							040	000	.159	.119
1640	142							040	000	.122	.057
1700	135							040	000	.106	.000
1720	132							040	000	.061	.063
1740	135							040	000	.117	.095
1800	159							040	000	.146	.140
1820	197							040	000	.013	.000
1840	232							040	000	.013	.000
1900	256							040	000	.005	.014
1920	271							040	000	.000	.000
1940	263							040	000	.000	.000
2000	259							040	000	.000	.000
2020	262							040	000	.000	.000
2040								040	000	.000	.000
2100	274							052	000	.000	.000
2120	269							060	000	.000	.000
2140	267							052	000	.000	.000
2200	270							061	000	.011	.034
2220	279							061	000	.004	.014
2240	292							070	000	.000	.000
2300	309							088	000	.000	.000
2320	321							089	000	.000	.000
2340	316							092	000	.000	.000

254-206

TABLE A.73 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	315							103	000	.000	.000
0020	327							100	000	.000	.000
0040	341							107	000	.000	.000
0100	339							109	000	.000	.000
0120	346							105	000	.000	.000
0140	326							093	000	.000	.000
0200	340							090	000	.000	.000
0220	040							040	B	.004	.000
0240	360							076	000	.000	.000
0300	392							070	000	.000	.000
0320	400							057	000	.000	.000
0340	400							063	000	.000	.000
0400											
0420											
0440	407							052	000	.000	.000
0500	385							042	000	.009	.000
0520	362							044	000	.000	.000
0540	321							043	000	.000	.000
0600	291							040	000	.000	.000
0620	269							040	000	.000	.000
0640	265							040	000	.000	.000
0700	248							040	000	.000	.000
0720	237							040	000	.000	.000
0740	224							040	000	.000	.000
0800	211							040	000	.000	.000
0820										.155	.000
0840										.000	.000
0900	215							040	000	.028	.249
0920	238							040	000	.064	.140
0940	247							040	000	.000	.176
1000	238							040	000	.075	.210
1020	240							040	000	.035	.139
1040	248							040	000	.011	.046
1100	241							040	000	.023	.091
1120	246							040	000	.003	.011
1140	260							040	000	.031	.089

TABLE A.74 ROI-NAMUR TO RAROTONGA, KING FISH

1210 GMT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	301	207-198	122-117	074-070 099-095 107-095 098-094 092-090 098-094	079-077 076-070 078-068 084-076 080-077	067-064 061-058 072-069 075-070 063-059	062-059 065-059	040	000	.045	.090
1220	268							062	000	.088	.062
1240	328							062	.015	.067	.134
1300	359							049	.029	.212	.187
1320	320							063	.070	.136	.082
1340	276							045	.052	.131	.189
1400	234							054	.178	.161	.192
1420	182							043	.141	.156	.156
1440	183							055	.031	.167	.136
1500	144							044	000	.232	.229
1520	153	251-231		075-071	063-060	067-058	052-048	046	.065	.400	.198
1540	144							040	.087	.200	.158
1600	133							040	000	.129	.108
1620	140							040	.130	.093	.022
1640	149							044	.114	.044	.021
1700	157							048	000	.009	.000
1740	172							057	000	.008	.018
1800	265							076	.106	.057	.000
1820	277							062	.014	.000	.000
1840	297							073-070		073-070	
1900	305	071	000	.028	.000						
1920	302	078	000	.038	.061						
1940	309	076	000	.004	.000						
2000	309	077	000	.003	.000						
2040	315	079	000	.003	.000						
2080	331	090	000	.024	.000						
2100	335	092	000	.000	.000						
2120	351	107	000	.033	.100						
2140	351	101	000	.038	.000						
2200	352	097	000	.081	.044						
2220	354	107	000	.095	.190						
2240	350	107	000	.058	.056						
2300	350	099	.020	.000	.000						
2320	350	101	000	.051	.000						
2340	348	094	.039	.000	.000						

TABLE A.74 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	353					120-104		107	000	.110	.000
0020	357							100	.062	.073	.000
0040											.000
0100	319					101-096		090	.022	.024	.024
0120	349							093	000	.154	.000
0140	350					103-097		107	.023	.070	.000
0200	320							107	000	.046	.000
0220	352							086	.094	.179	.115
0240	353					107-091		082	.060	.116	.106
0300	318					104-087		082	.072	.110	.000
0320	341					106-088		082	.069	.044	.039
0340	340							106	000	.028	.065
0400	345							054	000	.047	.000
0420								064	.063	.025	.113
0440	334							067	.053	.028	.031
0500	310							047	.055	.078	.041
0520	296							042	000	.015	.034
0540	263							041	.044	.024	.000
0600	267							040	000	.081	.000
0620	234							040	.179	.029	.058
0640	264							042	.243	.076	.046
0700	250							043	000	.117	.086
0720	173							041	000	.188	.347
0740	156								000	.144	.000
0800	179							041	000	.163	.631
0820	194							040	000	.086	.265
0840								040	000	.160	.085
0900	168							040	.057	.286	.286
0920	233							040	.047	.137	.243
0940	269							040	.018	.060	.133
1000	275							040	.022	.109	.177
1020	265							040	.025	.095	.000
1040	271										.095
1100	316										.000
1120											.000
1140											.000

TABLE A.75 ROI-NAMUR TO MIDWAY, KING FISH

1210 GMT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY	SKGD AVERAGE	SINGLE BKGD DAY
1200	161					097-093	053	.093	.000	.000
1220	163					097-093	040	.049	.010	.000
1240	150					075-071	040	.036	.000	.000
1300	127					096-089	040	.115	.000	.000
1320	116					095-090	040	.211	.055	.143
1340	131					083-080	040	.055	.032	.097
1400	133						040	.022	.090	.149
1420	140						040	.020	.051	.037
1500	139					098-091	040	.111	.064	.054
1520	148						040			.020
1540	130					083-079	048	.070	.102	.109
1600	135						047	.108	.047	.000
1620	125						047	.114	.192	.000
1640	117						047	.000	.068	.079
1700	111					083-070	040	.195	.140	.130
1720	122						040	.028	.132	.106
1740							040	.024	.102	.000
1800	151						040		.000	.000
1820	205						047	.027	.000	.000
1840	240						050	.013	.011	.021
1900	262						051	.095	.054	.018
1920	266						051	.014	.018	.011
1940	281						057	.000	.000	.000
2000	291						051	.013	.021	.000
2020	292						062	.017	.003	.009
2040	284						050	.041	.014	.029
2100	285						066	.009	.008	.016
2120	293					075-071	074	.047	.022	.014
2140	300					074-070	077	.000	.013	.000
2200	300					075-073	076	.000	.000	.000
2220	309						770	.000	.000	.000
2240	302						053	.000	.004	.000
2300	302						084	.000	.013	.000
2320	3.0						095	.000	.000	.000
2340							093	.000	.009	.017

TABLE A.75 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	314		219-210	188-178				092	.086	.000	.000
0020	311			187-179				093	.037	.005	.016
0040	301			186-175				088	.061	.010	.031
0100	320			182-176				091	.026	.009	.013
0120	346			219-180				087	.151	.006	.013
0140	360							087	.000	.000	.000
0200	383		330-315					084	.050	.000	.000
0220	386							103	.000	.010	.000
0240	362			190-177				085	.047	.000	.000
0300	385							078	.000	.004	.000
0320	365			189-179				078	.000	.003	.008
0340	393							073	.031	.000	.000
0400	408							068	.000	.057	.113
0420	433							065	.000	.000	.000
0440	440		339-320					056	.094	.003	.009
0500	428		371-354 466-388					056	.048	.004	.000
0520	362							065	.000	.003	.000
0540	345							056	.000	.005	.000
0600	329							040	.024	.011	.007
0620	308							049	.000	.017	.037
0700	300							041	.008	.003	.000
0720	287							041	.024	.022	.019
0740	275							040	.021	.019	.000
0800	258							040	.037	.031	.017
0820	231							041	.068	.041	.023
0840	230							041	.011	.022	.021
0900	199							041	.070	.011	.009
0920	180							050	.146	.029	.082
0940	179							049	.000	.019	.048
1000	168							049	.059	.006	.036
1020	174							050	.105	.013	.053
1040	180							041	.022	.025	.000
1100	200							046	.000	.014	.000
1120	219							049	.000	.000	.000
1140	236							041	.026	.006	.017

TABLE A.76 KAUAI TO TUTUILA, KING FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	182		174-138	115-099				040	.366	.227	.427
1220											.497
1240											.391
1300											.261
1320											.188
1340	149										.125
1400			138-133	098-091				041	.157	.064	.175
1420	084										.253
1440	128							040	.000	.253	.333
1500	114							040	.398	.119	.242
1520	113							040	.284	.050	.100
1540	128							040	.260	.102	.073
1600	127							040	.409	.040	.000
1620	079							040	.345	.109	.000
1640								045	.265	.068	.000
1700	180										.048
1720	206							121	.000	.179	.030
1740	210							116	.000	.104	.016
1800								124	.000	.146	.000
1820											.022
1840	280										.000
1900	265										.000
1920	272							123	.000	.061	.000
1940	243							125	.000	.044	.024
2000	257							147	.000	.009	.028
2020	264							132	.000	.019	.000
2040	251							123	.000	.000	.000
2100	267							126	.000	.000	.000
2120	269							142	.000	.000	.000
2140	263							123	.000	.005	.000
2200	228							129	.000	.000	.000
2220								126	.000	.006	.000
2240										.029	.000
2300	305										.000
2320	283							124	.249	.000	.000
2340	276							124	.000	.000	.000
	305							115	.000	.000	.000
								114	.320	.000	.000

TABLE A.76 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	325	208-199	151-147	174-162	180-165	177-164	172-165	176-164	177-165	.018	.030
0020	313										
0040	308										
0100	282										
0120	299	210-198	190-175	166-154	142-131				.009	.023	.000
0140	304										
0200	315										
0220	314										
0240	320										
0300	323										
0320	317										
0340	316										
0400	313										
0420	293										
0440	263										
0500	241										
0520	237										
0540	228										
0600	191										
0620	187										
0640	175										
0700	147										
0720	158										
0740	138										
0800	141										
0820	196										
0840	212										
0900	188										
0920	158										
0940	149										
1000	157										
1020	241										
1040	133										
1100											
1120											
1140											

TABLE A.77 ROI-NAMUR TO PALO ALTO, KING FISH

1210 GMT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	122								054	000	.066	.000
1220	139								041	000	.067	.212
1240	103								040	000	.129	.200
1300												.240
1320	060								041	000	.000	.000
1340	092								041	000	.000	.000
1400	088								041	.278	.080	.060
1440	074								041	.319	.021	.063
1500	078								041	000	.036	.108
1520	126								041	000	.090	.180
1540	103								041	.329	.107	.213
1600									043	000	.083	.167
1620	133									000	.000	.000
1640	131								055	000	.000	.000
1700	127								055	000	.000	.000
1720	127								118	000	.000	.000
1740									118	000	.250	.000
1800											.000	.000
1820	193								170	000	.000	.000
1840	230								119	.198	.000	.000
1900	249								140	000	.234	.177
1920											.071	.000
1940	303								129	.287	.059	.000
2000											.000	.000
2020											.000	.000
2040	237								130	000	.000	.000
2100	255								131	000	.000	.000
2120	255								130	000	.016	.000
2140											.000	.000
2200	233								127	000	.036	.000
2220	259								130	000	.000	.000
2240	262								158	000	.000	.000
2300	270								195	000	.000	.000
2320	270								196	000	.000	.000
2340	269								118	000	.051	.000
											.000	.000

TABLE A.77 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BMGD AVERAGE	SINGLE BMGD DAY
0000	297							092	000	.000	.000
0020	276							130	000	.000	.000
0040	295							126	000	.000	.000
0100											.000
0120											.000
0140											.000
0200	282							127	000	.069	.000
0220	237							142	000	.124	.000
0240											.224
0300											.203
0320											.177
0340	040							040	B	.000	.000
0400	102							069	000	.000	.000
0420	094							078	000	.071	.000
0440	078							058	000	.014	.000
0500	081							060	.333	.045	.134
0520	094							056	000	.035	.104
0540	062							053	000	.020	.059
0600	104							040	.250	.000	.000
0620	070							058	000	.038	.113
0640	095							071	000	.018	.000
0700	092							043	000	.000	.000
0720	101							045	.232	.113	.225
0740	101							040	000	.020	.000
0800	040							040	B	.050	.078
0820										.000	.000
0840										.022	.022
0900	108									.065	.065
0920	107							049	000	.206	.098
0940	101							045	000	.075	.073
1000	107							044	000	.064	.045
1020	107							043	000	.000	.082
1040	255							040	000	.000	.038
1100	249							040	000	.000	.065
1120	220							040	000	.009	.041
1140	227							040	000	.000	.000

TABLE A.78 OKINAWA TO HAWAII, KING FISH

1210 GMT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM				LOF	EVENT DAY	SKED AVERAGE	SINGLE SKED DAY
1200	070	127-115				054	000	.291	.000
1220	135					101	.353	.158	.000
1240	040					040	B	.274	.000
1300	116					085	000	.133	.000
1320		065-057							.000
1340									.000
1400									.000
1420									.000
1440									.000
1500									.000
1520									.000
1540	067					054	.615	.001	.000
1600	040					040	B	.293	.000
1620	040					040	B	.000	.000
1640	040					040	B	.000	.000
1700									.000
1720	111	087-071				056	.291	.352	.000
1740	103					061	.286	.593	.000
1800	135					063	.333	.363	.593
1820	069					059	000	.217	.755
1840	070	113-097				063	000	.235	.001
1900	110					062	.083	.000	.429
1920	076						000	.000	.000
1940								.000	.000
2000		074-070						.000	.000
2020								.000	.000
2040	142							.000	.000
2100	154					127	000	.151	.000
2120	155	081-069				088	000	.110	.329
2140	237					087	000	.105	.207
2200	257					096	000	.043	.053
2220	248					125	000	.114	.000
2240	247	077-069				125	000	.025	.000
2300	254					108	000	.180	.214
2320	272					127	000	.232	.353
2340	297					126	000	.000	.000
						126	000	.228	.295

TABLE A.78 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BIKED AVERAGE	SINGLE BIKED DAY
0000	295	184-172	157-143					123	.151	.180	.000
0020	303	185-173	149-143					124	.101	.223	.000
0040	325	187-172	161-153					159	.086	.109	.000
0100	334	188-172	160-145					124	.118	.022	.000
0120	327	159-140						139	.140	.000	.000
0140	360	183-175	136-133					129	.084	.032	.000
0200	355	150-144						158	.000	.018	.000
0220	313	149-145						160	.000	.000	.000
0240	301	148-139						146	.057	.067	.000
0300	293	152-146						123	.060	.065	.000
0320	274	200-185	147-134					122	.027	.044	.000
0340	271	141-135	127-116					106	.066	.059	.000
0400	242		121-114					090	.108	.118	.000
0420	210							097	.000	.088	.000
0440	210								.048	.048	.000
0500	145							087	.000	.100	.000
0520	142							087	.230	.000	.000
0540	209							088	.034	.368	.000
0600	175							088	.391	.261	.000
0620	152							040	.226	.226	.000
0640	040							067	.516	.284	.000
0700	129							086	.000	.242	.000
0720	133							087	.268	.163	.000
0740	143							101	.290	.532	.000
0800	132							087	.455	.420	.000
0820	131							067	.155	.449	.000
0840	138							086	.281	.180	.000
0900	143							090	.122	.235	.000
0920	139							089	.000	.281	.000
0940	141							088	.113	.740	.000
1000	040							040	.118	.118	.000
1020	040							056	.373	.182	.000
1040	040							040	.247	.247	.000
1100	040										.000
1120	131										.000
1140	040										.000

TABLE A.79 CANTON TO PALO ALTO, KING FISH

1210 OCT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	DKGD AVERAGE	SINGLE DKGD DAY
1200	141							040	000	.094	.000
1220	122							040	000	.063	.000
1240											.000
1300											.000
1320											.000
1340											.000
1400											.000
1420	040							040	B	.071	.000
1440	095							041	.148	.041	.000
1500	101							041	.100	.097	.000
1520	077							041	.083	.090	.000
1540	126							055	000	.163	.000
1600											.000
1620	040							040	B	.000	.000
1640	145							086	000	.000	.000
1700	175							120	000	.000	.000
1720	203							116	000	.000	.000
1740	225							117	000	.000	.000
1800	239							117	.093	.000	.000
1820	255							116	.016	.000	.000
1840	250							118	000	.000	.000
1900	258							127	000	.000	.000
1920								151	000	.000	.000
1940	303							125	.101	.000	.000
2000											.167
2020											.000
2040	275							156	000	.000	.000
2100	249							143	000	.000	.000
2120	284							148	000	.000	.000
2140											.000
2200	274							140	000	.000	.000
2220	279							144	000	.000	.000
2240	268							138	000	.000	.000
2300	275							163	000	.000	.000
2320	275							166	000	.000	.000
2340	259							125	000	.000	.000

TABLE A.79 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	251							121	000	.000	.000
0020	264							126	000	.019	.000
0040	313							125	000	.000	.000
0100											.000
0120											.186
0140											.000
0200	251							112	000	.123	.185
0220	233							101	000	.225	.320
0240											.242
0300											.064
0320											.047
0340	219										.075
0400	203							051	000	.033	.135
0420	360							058	.041	.045	.000
0440	160							040	000	.013	.000
0500	129							040	000	.012	.000
0520	079							040	000	.024	.000
0540	103							040	.103	.087	.000
0600	123							040	.175	.076	.000
0620	103							040	000	.103	.000
0640	097							040	000	.064	.000
0700	083							040	000	.156	.125
0720	074							047	000	.056	.113
0740	070							059	000	.032	.065
0800	040							040	.467	.038	.114
0820								040	B	.135	.254
0840											.480
0900											.469
0920	110							040	000	.209	.520
0940	040							040	B	.333	.333
1000	110							040	000	.214	.214
1020	095							041	000	.000	.000
1040	205							041	000	.072	.288
1100	092							041	000	.128	.400
1120	094							042	000	.000	.000
1140	090							041	000	.000	.000
										.103	.000

TABLE A.80 KAUAI TO FAIRBANKS, KING FISH

1210 OCT 1 1967.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	078							040	000	.000	.000
1220	132							041	000	.000	.000
1240	158							040	000	.000	.000
1300	074							041	000	.000	.000
1320	058							042	000	.000	.000
1340	075							040	000	.000	.000
1400	079							041	079	.053	.089
1420											
1440											
1500	068							041	000	.000	.000
1520	075							040	000	.000	.000
1540	080							042	000	.000	.000
1600	079							040	000	.000	.000
1620	089							040	000	.000	.000
1640	106							040	000	.000	.000
1700	132							056	000	.036	.079
1720	152							053	000	.020	.063
1740	152							071	000	.000	.000
1800	194							077	000	.000	.000
1820	199							105	000	.000	.000
1840	208							109	000	.000	.000
1900	200							106	000	.000	.000
1920	218							106	000	.000	.000
1940	229							112	000	.331	.681
2000	237							127	000	.000	.001
2020	250							113	000	.000	.000
2040	225							127	000	.000	.000
2100	223							128	000	.052	.052
2120										.000	.000
2140	241							139	000	.016	.032
2200	232							125	000	.032	.063
2220	234							130	000	.000	.000
2240	236							132	000	.115	.346
2300	233							133	000	.119	.238
2320	231							137	000	.064	.190
2340	232							142	000	.079	.169

TABLE A.80 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM					LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	241	243-206	209-189				143	.204	.000	.000
0020	241						128	.000	.000	.000
0040	261						107	.000	.000	.000
0100	277						071	.000	.000	.000
0120	272						103	.000	.000	.000
0140	257						102	.239	.042	.087
0200	259						102	.000	.000	.000
0220	179						100	.000	.018	.063
0240	177						061	.000	.000	.000
0300	179						052	.000	.000	.000
0320	179						046	.000	.000	.000
0340	161						044	.000	.000	.000
0400	139						040	.000	.000	.000
0420										.000
0440										.051
0500										.000
0520										.000
0540										.000
0600										.000
0620										.000
0640										.000
0700	076						040	.000	.000	.000
0720	077						040	.000	.000	.000
0740	075						040	.000	.000	.000
0800	076						040	.000	.000	.000
0820										.000
0840	078						043	.000	.000	.000
0900	076						040	.000	.000	.000
0920	072						042	.000	.000	.000
0940	076						040	.000	.083	.000
1000										.000
1020	126						040	.000	.000	.000
1040	113						040	.000	.000	.000
1100	078						040	.000	.000	.000
1120	078						040	.000	.000	.000
1140	078						040	.000	.000	.000

TABLE A.81 KAUAI TO RAROTONGA, KING FISH

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	1210 GMT 1 NOV.	
		546-517	429-317	361-320 282-177	280-151 142-131	122-114 121-114	096-079 106-088	075-071	073-070 073-069	053-044		
1200	640										.211	.077
1220	150										.348	.340
1240											.211	.211
1300	640	590-502	475-395 546-311	288-152 279-257 249-131	147-141 230-174						.220	.195
1320	640										.524	.225
1340	640										.397	.340
1400	640										.479	.372
1420	640	544-528	549-311								.402	.337
1440	612	543-431	407-279								.430	.217
1500											.460	.346
1520	640	587-569	537-322	275-156							.265	.200
1600	310										.424	.101
1620	164										.532	.578
1640	189										.275	.236
1700	278										.220	.215
1720	302										.144	.099
1740											.169	.090
1800											.187	.000
1820											.083	.037
1840	314										.168	.167
1900	306										.023	.023
1920	294										.134	.134
1940	287										.090	.079
2000	293										.057	.000
2020	300										.149	.139
2040	296										.147	.000
2100	303										.053	.000
2120	309										.236	.000
2140	276										.191	.000
2200	398										.236	.000
2220	319										.218	.000
2240	317											
2300	319											
2320	319											
2340	319											

TABLE A.81 CONTINUED

[illegible]

1210 OCT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BACKG AVERAGE	SINGLE BACKG DAY
1200	139								040	000	-.000	.000
1220	148								040	000	-.000	.000
1240	139								040	000	.041	.000
1300	104								040	000	.313	.625
1320	099								040	000	.030	.001
1340	105								040	000	.012	.000
1400	106								040	000	.000	.000
1420	106								040	000	.049	.147
1440	107								040	000	.000	.000
1500	113								040	000	.067	.133
1520											.000	.053
1540	313				271-120				040	000	.000	.000
1600	121								040	000	.048	.000
1620	116								040	000	.090	.018
1640	205				176-110				040	000	.204	.610
1700	200								040	000	.079	.001
1720	099								040	000	.227	.128
1740	097								040	000	.029	.000
1800	100								040	000	.020	.000
1820	107								040	000	.006	.013
1840	119								039	000	.021	.038
1900	145								040	000	.006	.018
1920	173								042	000	.000	.000
1940	182								040	021	.000	.000
2000	183								040	000	.000	.000
2020	167								040	000	.000	.000
2040	150								040	000	.000	.000
2100	157								040	000	.004	.013
2120	155								041	000	.000	.000
2140	169								047	000	.000	.000
2200	166								040	124	.000	.000
2220	171								046	000	.000	.000
2240	172								049	041	.000	.000
2300	165								049	138	.000	.000
2320	167								042	000	.000	.000
2340	167								042	061	.000	.000
	167								042	000	.006	.000

TABLE A.82 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	164								079	000	.006	.000
0020	160								040	000	.000	.000
0040	157								041	000	.000	.000
0100	157								040	000	.000	.000
0120	156								039	000	.000	.000
0140	159								040	000	.000	.000
0200	162								039	000	.000	.000
0220	164								040	000	.000	.000
0240	168								040	000	.000	.000
0300	174								040	000	.000	.000
0320	183								040	000	.000	.000
0340	201								040	000	.000	.000
0400	201								040	000	.000	.000
0420	216								040	000	.000	.000
0440	238								040	000	.000	.000
0500	256								040	000	.000	.000
0520	274								040	000	.141	.424
0540	263								040	000	.000	.000
0600	256								040	000	.000	.000
0620	307								040	000	.000	.000
0640	461								040	000	.000	.000
0700	332								040	000	.000	.000
0720	364								040	000	.015	.044
0740	299								040	000	.000	.000
0800	279								040	000	.000	.000
0820	201								040	000	.000	.000
0840	227								040	000	.000	.000
0900	158								040	000	.009	.046
0920	152								040	000	.000	.000
0940	249								040	000	.033	.041
1000	191								040	000	.000	.000
1020	218								040	.230	.000	.000
1040									040		.000	.000
1100	151								040	000	.000	.000
1120	157								040	000	.000	.000
1140	152								040	000	.000	.000

185-144

TABLE A.83 ROI-NAMUR TO FAIRBANKS, KING FISH

1210 GMT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM								LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	159									040	000	.000	.000
1220	160									040	000	.000	.000
1240	148									040	000	.000	.000
1300	126									040	000	.000	.000
1320	121									040	000	.000	.000
1340	138									040	000	.000	.000
1400	134									040	000	.000	.000
1420	139									040	000	.000	.000
1440										040	000	.000	.000
1500	139									040	000	.000	.000
1520	147									040	000	.000	.000
1540	136									040	000	.000	.000
1600	152									040	000	.000	.000
1620										040	000	.000	.000
1640	145									040	000	.000	.000
1700	137									040	000	.000	.000
1720	129									040	000	.000	.000
1740	134									040	000	.000	.000
1800	131									040	000	.000	.000
1820	147									040	000	.000	.000
1840	181									057	000	.000	.000
1900	211									057	000	.000	.000
1920	240									054	000	.000	.000
1940	254									055	000	.000	.000
2000	274									055	000	.000	.000
2020	272									103	000	.000	.000
2040	268									106	000	.000	.000
2100	245									114	000	.000	.000
2120										126	000	.000	.000
2140	300									127	000	.040	.091
2200	314									128	.258	.000	.000
2220	318									127	.293	.000	.000
2240	236									188	000	.000	.000
2300	231									138	000	.044	.132
2320	242									124	000	.000	.000
2340	248									121	000	.000	.000

298-250
293-237

TABLE A.83 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	264								142	000	.027	.082
0020	285								129	000	.000	.000
0040	301								111	000	.156	.156
0100	279								106	000	.000	.000
0120	282								104	000	.000	.000
0140	277								109	000	.000	.000
0200	268								115	000	.000	.000
0220	241								109	000	.000	.000
0240	235								105	000	.000	.000
0300	239								102	000	.000	.000
0320	224								106	000	.000	.000
0340	185								103	000	.000	.000
0400	188								099	000	.000	.000
0420												.197
0440												.000
0500												.000
0520												.000
0540												.000
0600												.000
0620												.000
0640	110								040	000	.044	.000
0700	109								041	000	.000	.000
0720	106								043	000	.000	.000
0740	109								041	000	.000	.000
0800	087								043	000	.000	.000
0820												.000
0840	078								040	000	.000	.000
0900	090								040	000	.000	.000
0920	088								040	000	.000	.000
0940	094								040	000	.000	.000
1000												.000
1020	093								040	000	.000	.000
1040	121								040	000	.000	.000
1100	131								040	000	.000	.000
1120	125								040	000	.000	.000
1140	147								040	000	.000	.000

TABLE A.84 KAUAI TO PALO ALTO, KING FISH

1210 GMT 1 NOV.							
TIME	MOF	GAPS IN HF SPECTRUM				LOF	EVENT DAY
1200	069						
1220							
1240							
1300							
1320							
1340							
1400	040					041	000
1420							
1440							
1500							
1520							
1540							
1600							
1620							
1640						040	B
1700							
1720	212						
1740							
1800							
1820							
1840							
1900							
1920	238						
1940							
2000							
2020							
2040	234						
2100							
2120							
2140							
2200	221						
2220							
2240							
2300							
2320	226						
2340							

TABLE A.84 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	238							102	000	.018	.000
0020	223							137	000	.057	.133
0040	247							091	000	.000	.000
0100											.097
0120											.219
0140											.286
0200	230							067	.086	.089	.178
0220	189							056	000	.047	.094
0240											.000
0300	138							051	000	.017	.000
0320											.000
0340	117							040	000	.000	.000
0400	100							045	000	.000	.000
0420	224							057	000	.028	.000
0440	165							045	000	.000	.000
0500	104							040	.078	.000	.000
0520	097							055	000	.049	.000
0540	095							040	.236	.000	.000
0600	075							040	000	.012	.037
0620	103							040	000	.029	.000
0640	070							043	000	.000	.000
0700	088							047	000	.065	.000
0720	073							040	000	.000	.000
0740	074							040	000	.053	.160
0800	040							040	B	.015	.000
0820											.250
0840											.392
0900	088										.000
0920	072							040	000	.019	.000
0940	089							040	000	.078	.273
1000	074							040	000	.030	.148
1020	084							041	000	.056	.094
1040	071							041	000	.078	.286
1100	077							042	000	.125	.303
1120	075							042	000	.000	.000
1140									000	.025	.000

TABLE A.85 OKINAWA TO TUTUILA, KING FISH

1210 GMT 1 NOV.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1200	158				128-122	114-107	084-067		000	.116	.061
1220	237					115-091		077	.241	.202	.067
1240	232					123-094		063	.163	.235	.439
1300	235							083	.191	.311	.306
1320	192							084	.000	.259	.330
1340	186							081	.000	.368	.372
1400											.330
1420	135					120-091	081-069	065	.586	.306	.037
1440	130					126-090	081-069	045	.741	.284	.255
1500	132					126-088	079-069	064	.706	.145	.213
1520	135					128-092	083-070	056	.709	.253	.331
1540	142					112-089	075-068	045	.474	.252	.282
1600	132				124-117	109-101	083-068	055	.468	.227	.195
1620	131						114-069	055	.592	.450	.467
1640											.000
1700	102						091-067	045	.649	.040	.079
1720	098						083-067	046	.558	.468	.590
1740	127						115-068	056	.662	.316	.410
1800	101						081-069	056	.267	.280	.468
1820	139						084-068	063	.368	.110	.000
1840	155					111-099		056	.141	.270	.250
1900	136					085-071		057	.000	.327	.311
1920	107							058	.000	.310	.000
1940	103							064	.000	.184	.000
2000	077							066	.000	.000	.000
2020											.000
2040											.000
2100	153							118	.000	.360	.000
2120	220							113	.000	.049	.000
2140	240							113	.000	.054	.000
2200	289							122	.000	.028	.000
2220											.000
2240	299							123	.000	.000	.000
2300	297							124	.000	.000	.000
2320	306							126	.000	.000	.000
2340	310							152	.000	.113	.000

TABLE A.85 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0000	344		247-240	152-141				130	.084	.175	.000
0200	333			151-141				125	.000	.236	.000
0400	332							125	.048	.156	.000
0100											.000
0120	333			178-170	151-143			127	.078	.125	.000
0140											.000
0200	382			181-139	151-143			128	.165	.000	.000
0220	389			174-165				126	.065	.067	.000
0240	405							151	.030	.091	.000
0300	426			300-150				126	.580	.091	.000
0320	433							126	.000	.149	.062
0340	437							126	.135	.062	.000
0400	459	372-348						166	.369	.022	.000
0420	451	406-389						117	.335	.034	.000
0440	314			138-132				124	.042	.056	.000
0500	414			142-134				152	.107	.036	.000
0520	384			143-134				115	.119	.042	.023
0540	342			193-184				109	.039	.081	.039
0600	292							127	.000	.037	.052
0620	266							145	.000	.028	.035
0640	263							111	.000	.055	.027
0700	242							170	.000	.031	.000
0720	249							088	.000	.055	.000
0740	234							085	.000	.037	.000
0800	237							087	.000	.047	.000
0820	232							086	.000	.162	.250
0840	230							086	.000	.124	.156
0900	236							086	.000	.210	.419
0920	261							085	.000	.126	.171
0940	263							064	.000	.091	.000
1000	255							067	.000	.176	.318
1020											.157
1040	249					083-069		066	.077	.067	.000
1100	263							089	.000	.146	.000
1120	268					073-068		064	.025	.144	.154
1140	255							084	.000	.106	.080

TABLE A.86 ROI-NAMUR TO HAWAII, TIGHT ROPE

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	0730 GMT & EDT.	
											BKGD	SINGLE
											DAY	DAY
0720	295							040	000	.131	.000	.000
0740	272							040	.164	.021	.052	.052
0800	271							040	.143	.015	.000	.000
0820	272							040	000	.020	.000	.000
0840	268							041	000	.015	.000	.000
0900	268							040	.013	.000	.000	.000
0920	259							043	000	.048	.000	.000
0940	237							044	000	.019	.000	.000
1000	233							040	000	.064	.000	.000
1020	226							044	000	.052	.000	.000
1040	213							041	000	.121	.000	.000
1100	187							040	000	.071	.000	.000
1120	202							041	000	.010	.000	.000
1140	217							041	000	.085	.000	.000
1200											.000	.000
1220	216							040	000	.094	.000	.000
1240	229							041	000	.013	.000	.000
1300	255							040	000	.024	.000	.000
1320	295							045	000	.000	.000	.000
1340											.000	.000
1400											.000	.000
1420											.000	.000
1440	206							041	000	.052	.000	.000
1500	126							041	000	.097	.028	.028
1520	112							041	000	.000	.000	.000
1540	132							041	000	.032	.000	.000
1600	112							040	.153	.020	.020	.020
1620	079							040	000	.071	.143	.143
1640	093							041	000	.020	.000	.000
1700	114							040	000	.000	.000	.000
1720	157							040	060	.032	.064	.064
1740	211							040	.146	.025	.024	.024
1800	253							042	.118	.045	.060	.060
1820	197							044	000	.008	.000	.000
1840	227							041	000	.000	.000	.000
1900	229							042	000	.000	.000	.000

TABLE A.86 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1920	291	410-352	349-295	077-069					054	000	.000	.000
1940	290								050	000	.000	.000
2000	299								050	000	.000	.000
2020	266								050	000	.112	.000
2040		410-352	349-295	077-069					053	000	.000	.000
2100	349								057	000	.000	.000
2120	351								061	000	.020	.000
2140	360								055	000	.023	.000
2200	347	410-352	349-295	077-069					057	000	.000	.000
2240	350								055	000	.000	.000
2300	352								056	000	.015	.000
2320	355								060	000	.000	.000
2340	343	410-352	349-295	077-069					064	000	.044	.088
0000	334								058	000	.107	.019
0020	346								061	000	.072	.008
0040	380								059	000	.035	.020
0100	413	410-352	349-295	077-069					059	000	.013	.013
0120	435								065	000	.010	.012
0140	462								062	000	.021	.000
0200	429								062	.148	.050	.099
0220	453	410-352	349-295	077-069					058	.021	.000	.000
0240	437								058	000	.015	.275
0300									061	.161	.006	.030
0320	302								055	000	.002	.013
0340	397	410-352	349-295	077-069					046	000	.003	.000
0400	363								041	000	.047	.007
0420	359								041	000	.012	.000
0440	354								040	000	.000	.024
0500	317	410-352	349-295	077-069					041	000	.000	.000
0520	303								041	000	.000	.000
0540	322								041	000	.000	.000
0600	306								041	000	.000	.000
0620	295	410-352	349-295	077-069					041	000	.000	.000
0640									040	000	.000	.000
0700	297								040	000	.000	.000

TABLE A.87 ROI-NAMUR TO KAUAI, TIGHT ROPE

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	0730 GMT & MDY.	
										BMGD AVERAGE	SINGLE BMGD DAY
0720	280							039	000	-.000	.000
0740	281							039	000	.044	.000
0800	278							039	000	.036	.000
0820	270							039	000	.000	.000
0840											.000
0900	253							039	000	.000	.000
0920											.000
0940	250							040	000	.000	.000
1000	251							039	000	.000	.000
1020	210							039	000	.000	.000
1040	242							039	000	.000	.000
1100	154							039	000	.000	.000
1120	152							039	000	.000	.000
1140	160							039	000	.000	.000
1200	166							039	000	.000	.000
1220	164							039	000	.000	.000
1240	178							040	000	.000	.000
1300	218							040	000	.000	.000
1320	220							040	000	.000	.000
1340								040	000	.000	.000
1400	260									.000	.000
1420	231							039	000	.000	.000
1440	184							040	000	.000	.000
1500	148							040	000	.000	.000
1520	126							040	000	.000	.000
1540	136							040	000	.000	.000
1600										.000	.000
1620	112							040	000	.000	.000
1640	086							040	000	.000	.000
1700	096							040	000	.000	.000
1720	115							040	000	.000	.000
1740	166							040	000	.000	.000
1800	226							040	000	.000	.000
1820	225							040	000	.000	.000
1840	199							045	000	.000	.000
1900	268							045	000	.000	.000
						259-233			.107	.000	.000

TABLE A.87 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1920	280							047	000	.000	.000
1940	277							053	000	.000	.000
2000	284							052	000	.000	.000
2020	295							051	000	.000	.000
2040											.000
2100											.000
2120	364							064	000	.000	.000
2140	372							068	000	.000	.000
2200	347							066	000	.005	.009
2220	327							066	003	.002	.000
2240	327							066	003	.000	.000
2300											.000
2320	324							067	000	.005	.009
2340	325							069	000	.023	.023
0000	339							067	000	.000	.000
0020	339					307-269		064	.138	.000	.000
0040	361					335-272		056	.207	.000	.000
0100	388							065	000	.000	.000
0120	430							063	000	.000	.000
0140	313							063	000	.000	.000
0200	328							059	000	.000	.000
0220	330							061	000	.107	.107
0240	465							039	.246	.009	.009
0300	431					409-304		052	.298	.000	.000
0320	402					396-287		054	.164	.000	.000
0340	340					334-277		049	.361	.000	.000
0400	346					312-207		048	.154	.028	.000
0420	329					291-245		041	000	.127	.254
0440	356							041	000	.056	.000
0500	348					303-256		040	.153	.063	.000
0520	255							040	000	.109	.000
0540	265							040	000	.112	.000
0600	252							040	000	.051	.000
0620	232							040	000	.000	.000
0640	229							040	000	.042	.000
0700	216							040	000	.014	.043

TABLE A.88 CANTON TO MIDWAY, TIGHT ROPE

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0720	172	158-139	125-112	097-091	081-073	063-061	050-044	040	.106	.176	.000
0740	180			095-090	084-076			040	.379	.221	.000
0800	132			124-080	062-060			052	.575	.307	.000
0820	221	205-185	169-131	085-079	064-061			043	.399	.259	.000
0840	277							048	.000	.265	.396
0900	134			110-078	076-074			041	.462	.439	.000
0920	241			111-077				041	.555	.503	.000
0940	151			144-078	074-071			042	.734	.588	.000
1000	129			124-091	085-072			040	.663	.569	.000
1020	232	222-184	169-137	124-099	093-090	079-077	062-057	040	.594	.478	.000
1040											
1100	208										
1120	183	189-151	122-118	094-091	084-068	062-060	050-043	040	.417	.412	.261
1140	214	173-126	140-132	094-091	083-074	072-069	061-057	049	.328	.363	.528
1200						062-057	047-042	040	.201	.400	.001
1220	139										
1240	120			099-092	082-078	062-057		048	.176	.445	.816
1300	128			096-091	072-069			050	.114	.669	.562
1320	231			134-094	083-075	063-061		052	.263	.250	.001
1340	133			112-093	072-070	063-059		049	.154	.285	.605
1400	092	159-152	144-138 124-116	112-091	072-068	062-058		053	.338	.510	.365
1420				084-079	075-073			064	.250	.526	.604
1440	091										
1500	142			082-070				063	.429	.469	.029
1520	131			128-094	081-078			053	.425	.531	.034
1540	108				062-060			048	.024	.101	.357
1600	099			072-077		062-058		054	.111	.388	.388
1620	090			084-070		065-058		049	.420	.285	.370
1640	091			085-070	086-069	064-058		049	.512	.238	.075
1700	070					064-057		053	.605	.351	.086
1720	091			074-070	065-060			050	.350	.156	.000
1740	120			076-070		064-059		054	.378	.000	.000
1800	158							056	.203	.062	.062
1820	250							064	.000	.322	.036
1840								087	.000	.202	.055
1900	281							098	.000	.040	.099

0730 GMT & NOV.

TABLE A.88 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1920	281							108	000	.070	.108
1940	279							103	.068	.094	.128
2000	297							096	000	.168	.000
2020	317							104	000	.227	.000
2040	298							107	.089	.173	.161
2100	319							107	000	.232	.000
2120	297							114	000	.117	.000
2140	325							086	000	.222	.000
2200	339							110	000	.000	.000
2220	317							104	000	.063	.063
2240	339							105	000	.000	.000
2300	325							103	000	.037	.000
2320	317							117	000	.119	.000
2340	318							127	000	.000	.000
0000	354							108	000	.000	.000
0020	382							098	000	.038	.020
0040	389							103	000	.264	.018
0100	352							095	.064	.000	.000
0120	311								.046	.061	.019
0140											.000
0200	287							083	.069	.116	.139
0220	283							085	.035	.103	.103
0240	279							071	.077	.000	.000
0300	265							075	.016	.046	.089
0320	246							074	.035	.024	.000
0340	264							063	.060	.000	.000
0400	217							057	.012	.024	.000
0420	217							058	.031	.020	.000
0440	315							055	.285	.004	.013
0500	213							048	.121	.041	.000
0520	219							040	000	.000	.000
0540	219							040	000	.000	.000
0600	200							040	.011	.005	.015
0620	174							040	.019	.018	.055
0640	177							040	.045	.112	.053
0700	134							047	.162	.009	.000
								047	.172	.139	.109

TABLE A.89 ROL-NAMUR TO HAWAII, HOUSATONIC

1601 OCT 30 OCT.											
TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
1600	125					098-086	080-072	062-058	040	.282	.055
1620	114					100-094	081-078	074-071	040	.257	.270
1640	104					075-072		063-059	041	.159	.248
1700	104								041	.000	.146
1720	100								041	.000	.058
1740	095								044	.000	.060
1800	154								054	.040	.129
1820	175					074-070			054	.050	.022
1840	196					076-070			053	.000	.000
1900	244								055	.000	.000
1920	246								054	.000	.000
1940	252								061	.000	.037
2000	288								058	.000	.005
2020	309								056	.000	.147
2040	321								052	.000	.024
2100	322								054	.000	.055
2120	325								051	.000	.000
2140	318								055	.000	.000
2200	330								061	.000	.023
2220	336								058	.000	.008
2240											
2300											
2320	367					128-120	080-077		055	.035	.046
2340											
0000											
0020	367				151-145						
0040	378										
0100	400										
0120	392				193-174	125-119	105-098		051	.019	.157
0140	349				160-139		111-105		055	.022	.212
0200							093-085		058	.086	.152
0220								053-049	054	.013	.073
0240									040		.025
0300	320										
0320	363								049	.000	.197
0340	072								045	.000	.199
									040	.094	.035

TABLE A.89 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0400	385	337-308	072-069					049	.009	.187	.084
0420	394							049	.084	.115	.379
0440	379							041	.000	.153	.344
0500	356							040	.000	.000	.287
0520		316-274 309-257									.000
0540											.000
0600	328							040	.146	.004	.000
0620	340							040	.173	.008	.000
0640	313							040	.000	.011	.033
0700	204							040	.000	.044	.088
0720	197							040	.000	.036	.108
0740	234							040	.000	.012	.022
0800	221							040	.000	.041	.000
0820	273							040	.000	.048	.000
0840	253							040	.000	.120	.000
0900	232							040	.000	.086	.000
0920	225	186-169						040	.092	.197	.077
0940	217							041	.000	.147	.180
1000	236							040	.000	.266	.000
1020	248							040	.000	.307	.308
1040	237	213-200					050-047	040	.014	.307	.298
1100	266							040	.020	.140	.000
1120	237							040	.080	.136	.000
1140	229							040	.198	.144	.145
1200	214	205-192					050-047	040	.069	.138	.154
1220	180							041	.023	.184	.000
1240	195							040	.000	.110	.185
1300	187							040	.000	.150	.389
1320	177	152-146 150-136 161-137	084-079	064-060			051-047	040	.000	.188	.345
1340	172							041	.022	.360	
1400	184							040	.076	.147	
1420	174							040	.160	.203	
1440		119-106 100-092	083-079				051-047	041	.211	.194	
1500	108										
1520	133							043	.046	.435	
1540	116							041	.239	.289	
								040	.158	.277	

TABLE A.90 ROL-NAMUR TO KAUAL, HOUSATONIC

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	1601 GMT 30 OCT.	
											SINGLE BKGD DAY	
1600	123							040	000	.000	.000	
1620	124							040	000	.000	.000	
1640	113							040	000	.000	.000	
1700	144							041	000	.000	.000	
1720	176							041	000	.000	.000	
1740	187							040	000	.000	.000	
1800	090							040	000	.000	.000	
1820	210							040	000	.000	.000	
1840	202							040	000	.000	.000	
1900	223							045	000	.000	.000	
1920	223							046	000	.000	.000	
1940	249							045	000	.000	.000	
2000	277							045	000	.000	.000	
2020												
2040												
2100	318							052	000	.000	.000	
2120	330							054	000	.036	.000	
2140	317							051	000	.007	.000	
2200	313							057	000	.000	.000	
2220	335							059	000	.000	.000	
2240	329							055	000	.026	.000	
2300												
2320												
2340	335							051	000	.000	.000	
0000	345							057	000	.027	.000	
0020	366							053	000	.000	.000	
0040	355							054	000	.024	.000	
0100	366							051	000	.000	.000	
0120	377							049	000	.003	.000	
0140	391							049	000	.000	.000	
0200	407							051	000	.000	.000	
0220	389							043	000	.000	.000	
0240	361							043	000	.000	.000	
0300												
0320	348							042	000	.000	.000	
0340	385							040	000	.000	.000	

TABLE A.90 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM							LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0400	410								040	000	.000	.000
0420	433								040	000	.000	.000
0440	415								041	000	.000	.000
0500												.000
0520												.000
0540	311								040	000	.000	.000
0600	319								040	000	.000	.000
0620												.000
0640												.000
0700												.000
0720	313								040	000	.000	.000
0740	317								040	000	.000	.000
0760	294								040	000	.000	.000
0800	283								040	000	.000	.000
0820												.000
0840	261								041	000	.000	.000
0900	251								040	000	.000	.000
0920	257								041	000	.000	.000
0940	256								040	000	.000	.000
1000	240								041	000	.000	.000
1020	215								040	000	.000	.000
1040												.000
1100												.000
1120	220								040	000	.050	.000
1140	203								041	000	.021	.000
1200	225								040	000	.000	.000
1220	227								040	000	.000	.000
1240	216								041	000	.000	.000
1300	199								041	000	.000	.000
1320	187								041	000	.000	.000
1340	188								041	000	.000	.000
1400	170								040	000	.000	.000
1420	169								040	000	.000	.000
1440	173								041	000	.000	.000
1500	184								041	000	.000	.000
1520	176								041	000	.000	.000
1540	175								041	000	.000	.000

TABLE A.91 CANTON TO MIDWAY, HOUSATONIC

1601 GMT 30 OCT.

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	SKGO AVERAGE	SINGLE BKGD DAY
1600	117							047	.314	.220	.172
1620	124							053	.479	.398	.000
1640	117							052	.292	.417	.235
1700	093							053	.425	.480	.275
1720	091							052	.231	.299	.044
1740	131							053	.282	.353	.333
1800											.056
1820	184							063	.041	.182	.075
1840	199							063	.103	.153	.100
1900	214							086	.000	.095	.108
1920	235							086	.000	.106	.090
1940											.136
2000	258							104	.000	.096	.043
2020	267							104	.000	.054	.066
2040	269							097	.000	.029	.000
2100	272							101	.053	.039	.101
2120	286							096	.053	.080	.079
2140	292							101	.042	.006	.000
2200	298							093	.000	.064	.101
2220	268							085	.191	.094	.094
2240	274							083	.120	.224	.238
2300											.198
2320	321										.059
2340	334							101	.136	.083	.067
0000	334							105	.000	.079	.023
0020	365							117	.028	.050	.084
0040	379							116	.000	.079	.169
0100	319							113	.228	.057	.118
0120	397							087	.187	.023	.067
0140	269							072	.127	.000	.000
0200											.000
0220	249							061	.000	.000	.000
0240	258							053	.024	.000	.000
0300	274							084	.024	.000	.000
0320	271							047	.080	.000	.000
0340											.000

TABLE A.91 CONTINUED

TIME	MOF	GAPS IN HF SPECTRUM						LOF	EVENT DAY	BKGD AVERAGE	SINGLE BKGD DAY
0400	256					073-071		052	000	.000	.000
0420	262							040	.036	.000	.000
0440	263							040	.027	.000	.000
0500	256					074-071		048	.101	.000	.000
0520	224		190-180	166-158				040	.261	.000	.000
0540	216		186-150	139-130				040	.057	.000	.000
0600	207		156-149			087-080		047	.075	.000	.000
0620	199		186-172	155-146		100-095		040	.233	.031	.063
0640	144			125-115		093-088		041	.146	.007	.014
0700	168		159-147			075-073		041	.189	.076	.192
0720	157					083-073		040	.094	.009	.019
0740	164			129-119		097-090		041	.187	.030	.061
0800						084-077					
0820											
0840	158			125-117		083-077		041	.145	.105	.195
0900	251		209-199	185-163		119-108		047	.240	.106	.109
0920	152					082-079		046	.085	.061	.319
0940	134					083-075		047	.126	.024	.184
1000	226							047	.402	.121	.205
1020	235		192-134			082-078		047	.420	.095	.122
1040	236		209-136			083-079		051	.184	.188	.295
1100	228		185-174	155-136		083-078		047	.265	.092	.000
1120	231		185-168	155-146		087-079		041	.121	.436	.000
1140	232		169-157			085-079		042	.032	.200	.263
1200	211					082-078		042	.036	.229	.000
1220	201							042	.020	.324	.296
1240	199					063-060		051	.000	.328	.315
1300	182					063-060		052	.071	.286	
1320	188					063-061		048	.013	.432	
1340	182							051	.000	.544	
1400	182							051	.000	.549	
1420	169							047	.000	.348	
1440	149							048	.000	.332	
1500	156							048	.000	.000	
1520	145							048	.000	.000	
1540	135							048	.000	.531	

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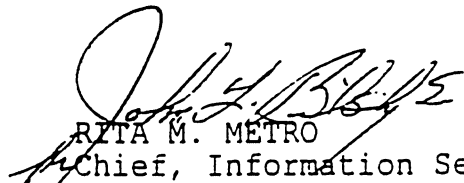
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